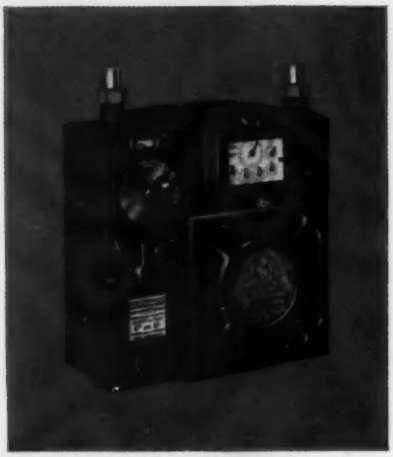
Gas Journal

VOL. 291. 109th YEAR. LONDON, AUGUST 14, 1957. Nº 4909. PRICE 1/6



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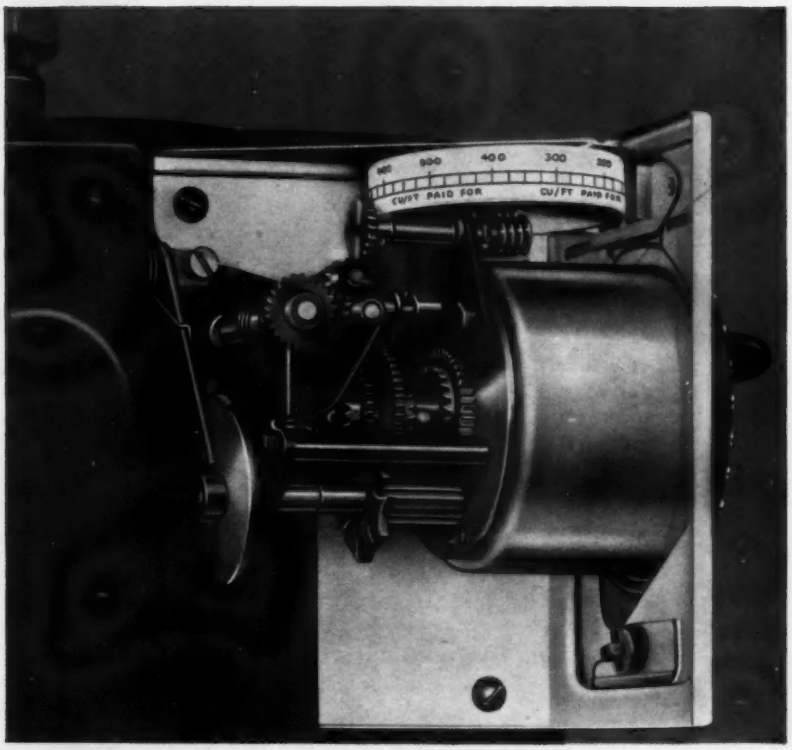

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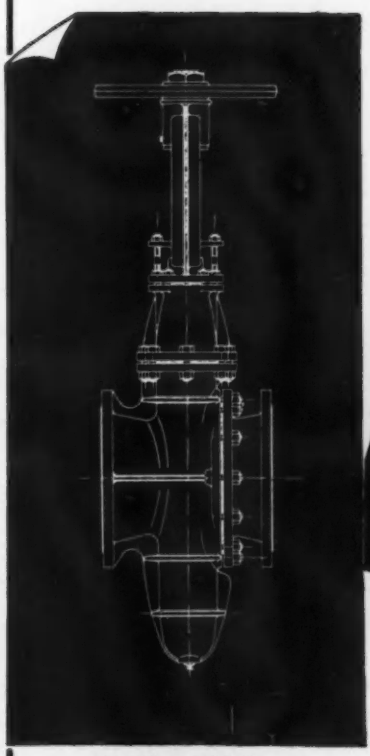

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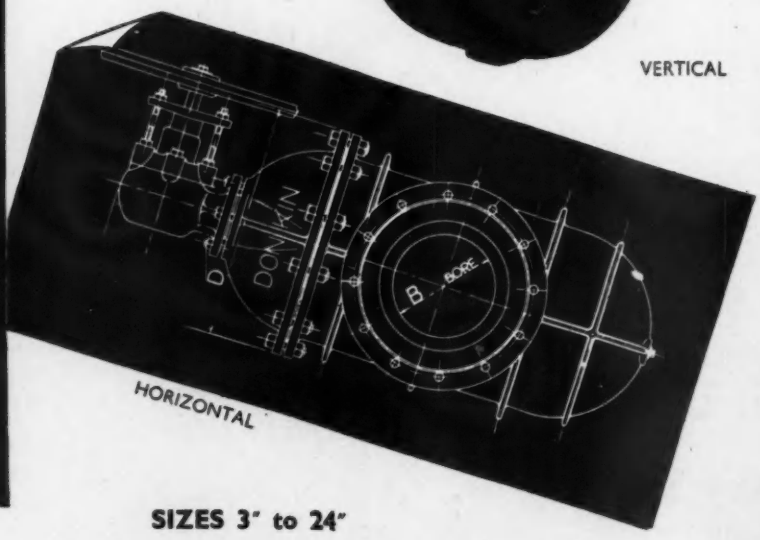

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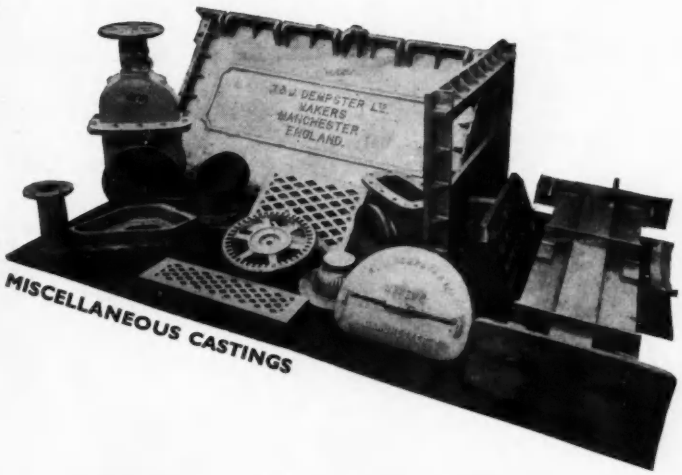

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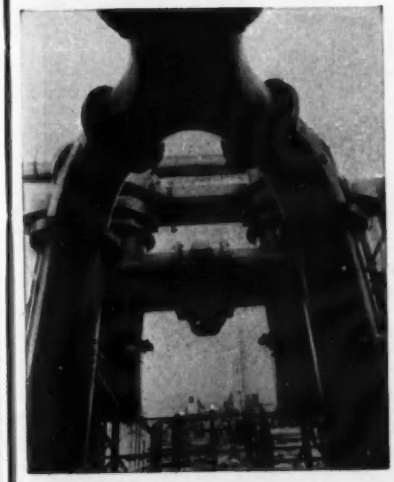

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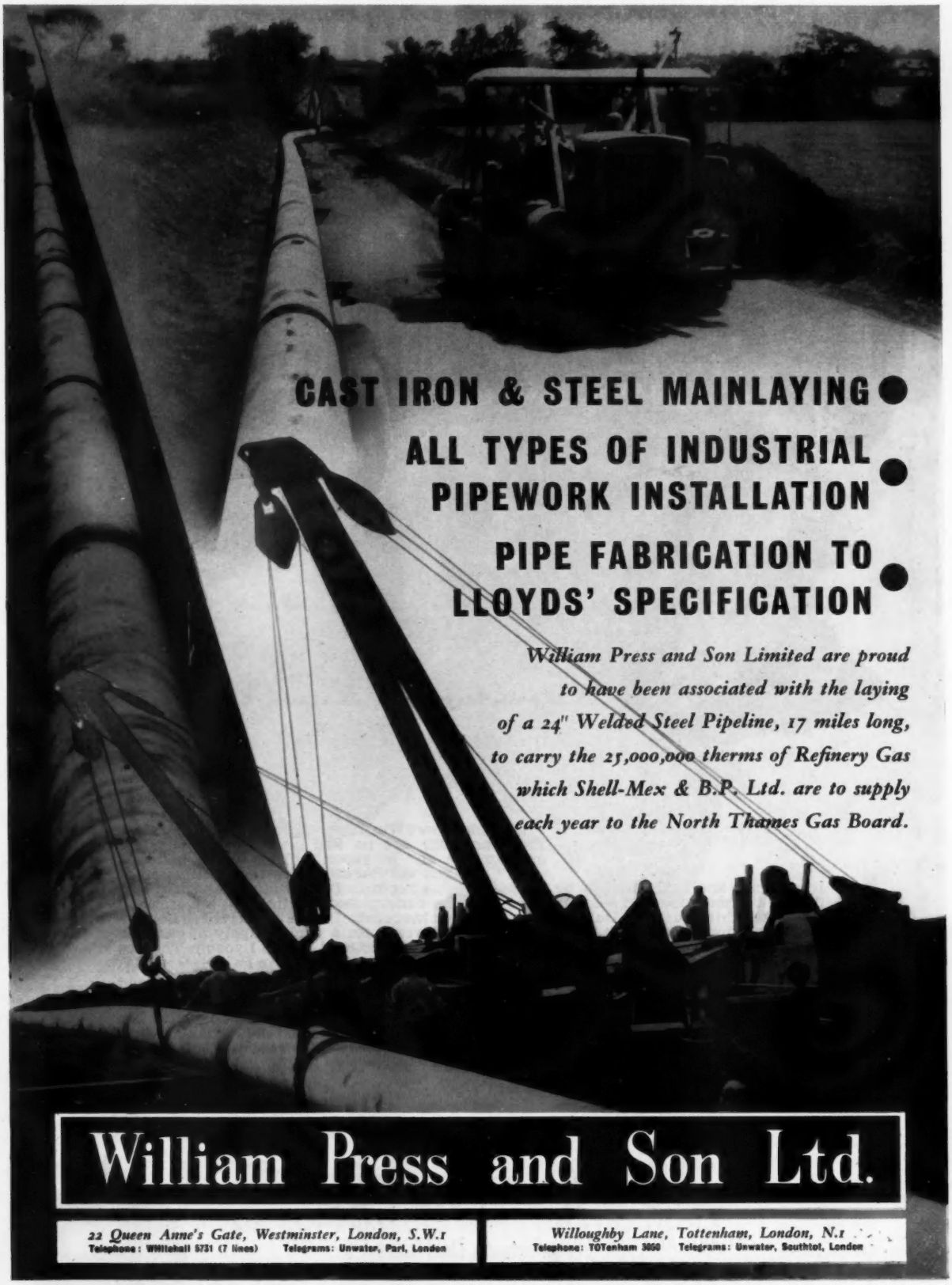
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Picture of Lighting of Pall Mall 1807/8

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1763 - 1830 (Founder of the Gas Light and Coke Company)

Frederick Albert Winsor was born in 1763 in Moravia. From an early age he was interested in physical experiments and he records filling small balloons with " rarefied air " obtained by the distillation of iron filings and coal. In 1802 he visited Lebon's room in Paris which was lit by gas distilled from wood and some months later he constructed a " lighting apparatus " which he exhibited to the Duke of Brunswick and his court. In 1803 he arrived in London with ambitious schemes for the erection of gas works for a public supply of gas. He distributed numerous pamphlets on the subject and lectured at the Lyceum Theatre and despite opposition he gave the first exhibition of street lighting in Pall Mall in 1807.

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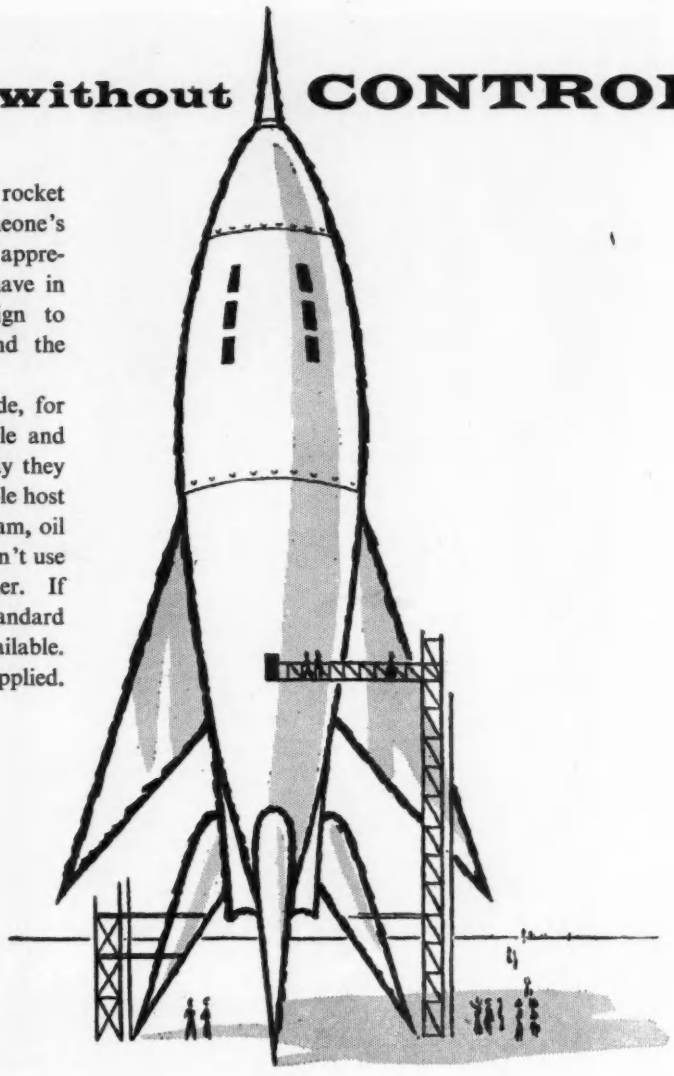

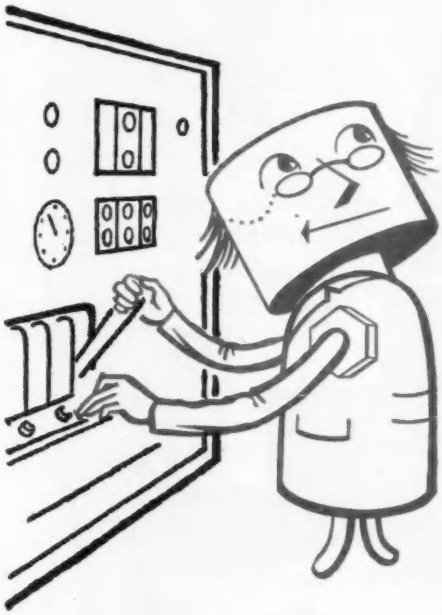

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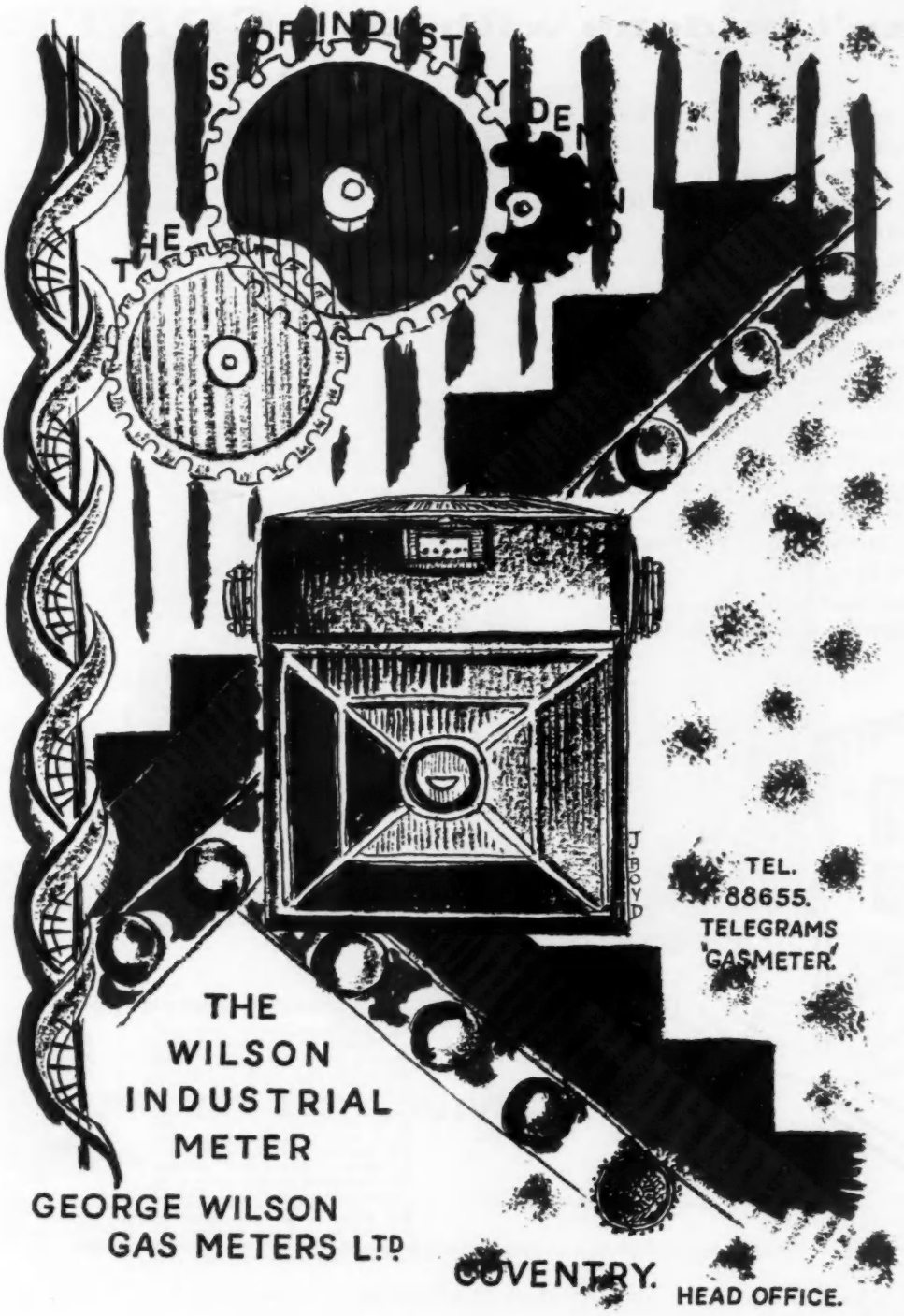
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The six bearings on a 3-roll idler often present difficult lubrication problems and four of the bearings are in hard-to-reach spots under the belt where dust and dirt can find an easy entry. Clog one of these bearings; slow or stop the roll...and replacement costs for belt and idlers start to soar.

The Joy Limberoller is a flexible steel shaft suspended from a bearing at each end, forming a natural trough and turning on its own axis. The two bearings never require maintenance or greasing and are located clear of the dirt.

Tough, resilient Neoprene covers the steel shaft and a series of moulded Neoprene discs support the belt. Flexibility of the idler centres the load, guides the belt, adjusts automatically to loading conditions and gives a smooth ride.

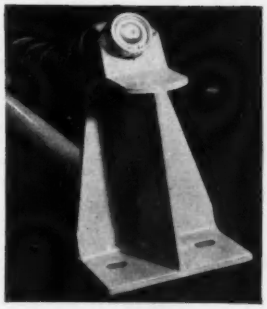
LIMBEROLLER BEARINGS STAY OUT OF THE DIRT

The natural load-carrying catenary of this flexible idler keeps the two bearings up out of the dirt zone. A smooth, 'no-bump' ride reduces spillage and lengthens belt life, and the idlers are long lasting, too — units in service have passed 600 million revolutions, carried nearly a million tons of material without detectable weakening or wear.

Really "sealed for life" Bearings on the JOY LIMBEROLLER IDLER

If there's a place to put grease into an idler bearing then dirt can also enter. That's why Joy Limberollers are sealed up tight for life.

The flexible steel shaft of the Limberoller has swaged shank ends which slip-fit into the inner race of the double row precision ball bearings. A snap ring locks the end in place and a Neoprene wiping seal keeps the grease in, dirt out. A second Neoprene ring and bearing cap held by a snap-ring seals the other end. The outer race, cadmium-plated, forms a cartridge to fit the idler supporting bracket. Bearings are packed with grease of 7-year-plus shelf life, rated for operational temperatures through -35°F to +275°F.



SEVERE RUNNING TEST PROVES THE BEARING

Under normal operating conditions Limberoller bearings rotate at approx. 510 r.p.m. under a belt travelling at 400 ft. per min. Taking the weight of material between two Limberollers as an average of 150 lbs., a force of 47.6 lbs. is exerted acting vertically on the bearing.

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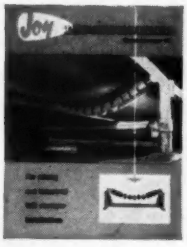
TAKE 10 ON TEST

Materials handling engineers are testing Limberollers for themselves by installing ten in a tough spot on the belt. They're already delighted with the results — so take a tip and try the Ten Limberoller Test yourself.



Publication No. L.115 contains full technical details of the range of Limberoller idlers — write now for your copy.

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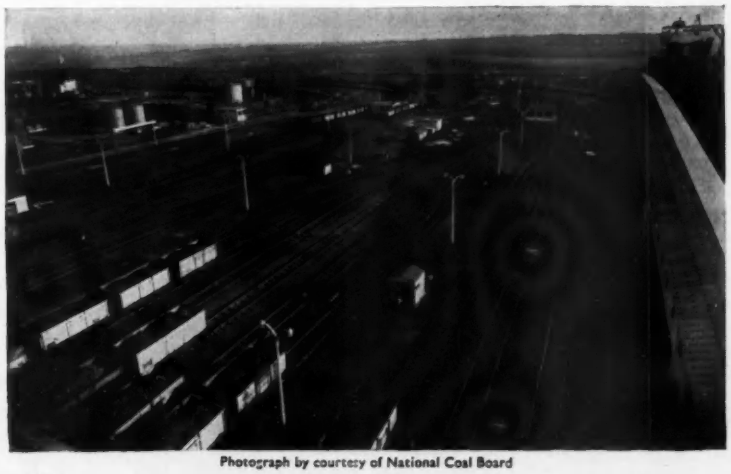

Photograph by courtesy of National Coal Board

for a complete Track Service

Photograph by courtesy of National Coal Board

◀ **Work begins at Cadeby: The National Coal Board again entrusts the Eagre Construction Co. Ltd. with a similar project. Earthworks, Drainage, Track Laying and ancillary works for thirteen miles of Sidings are now in progress at Cadeby Main.**

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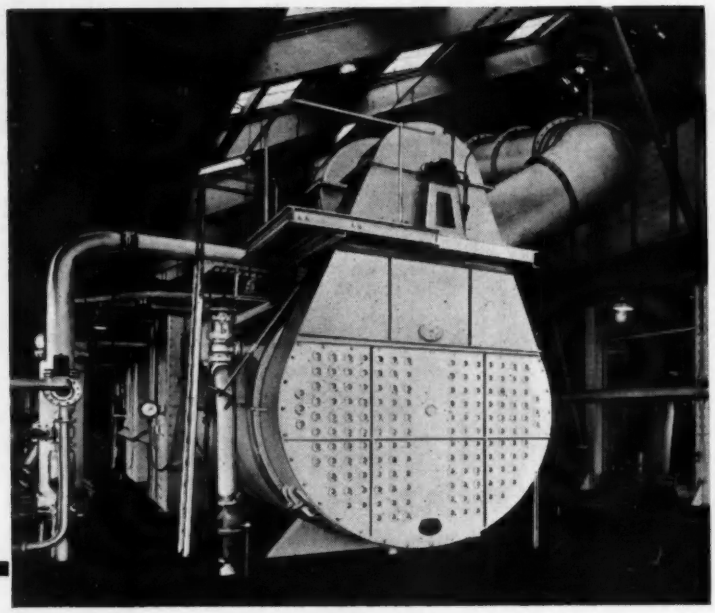
WASTE HEAT RECOVERY IN THE *Gas Industry*



One of the Waste Heat Boilers in the Glover-West installation at the Dumbarton Gas Works

Photograph by courtesy of the Scottish Gas Board

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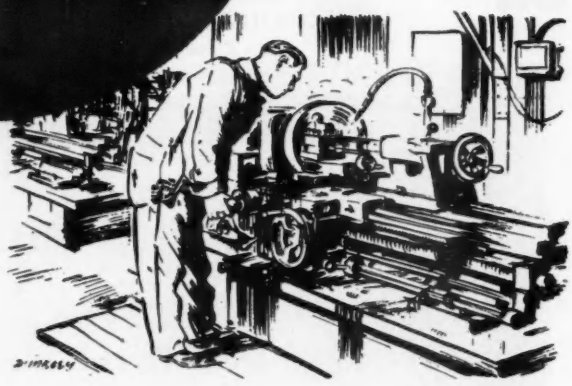

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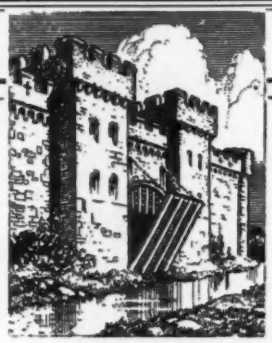

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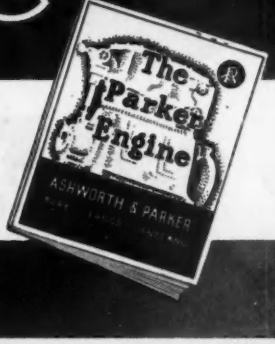

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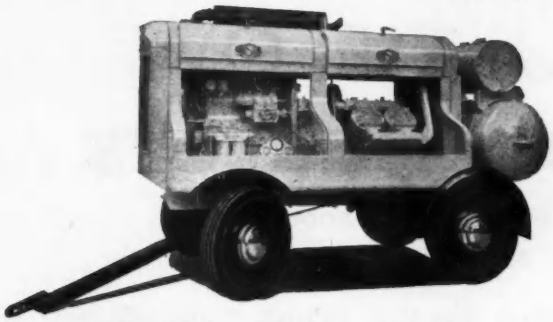

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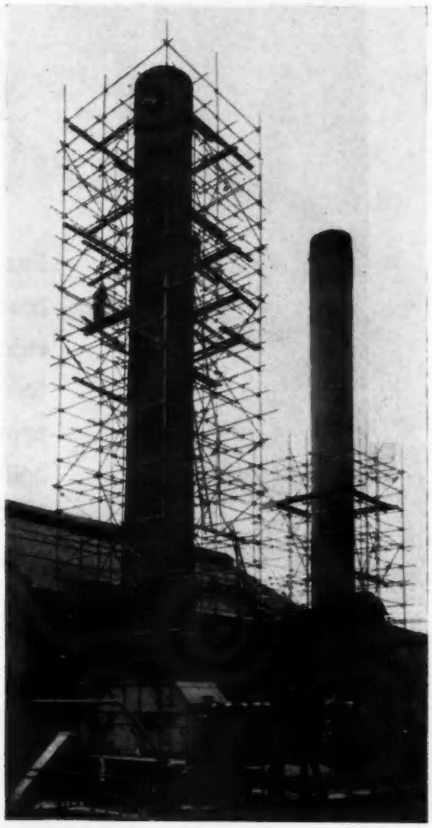

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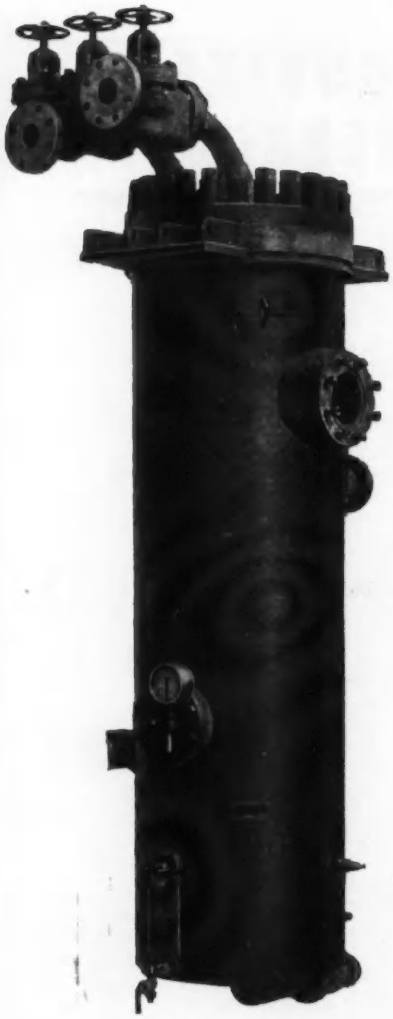

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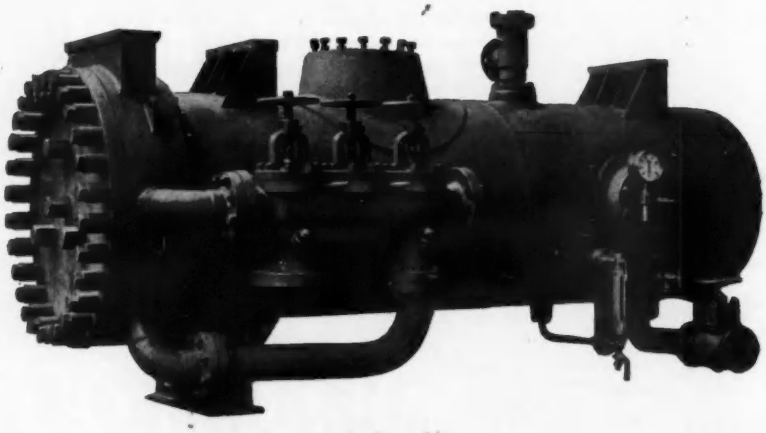

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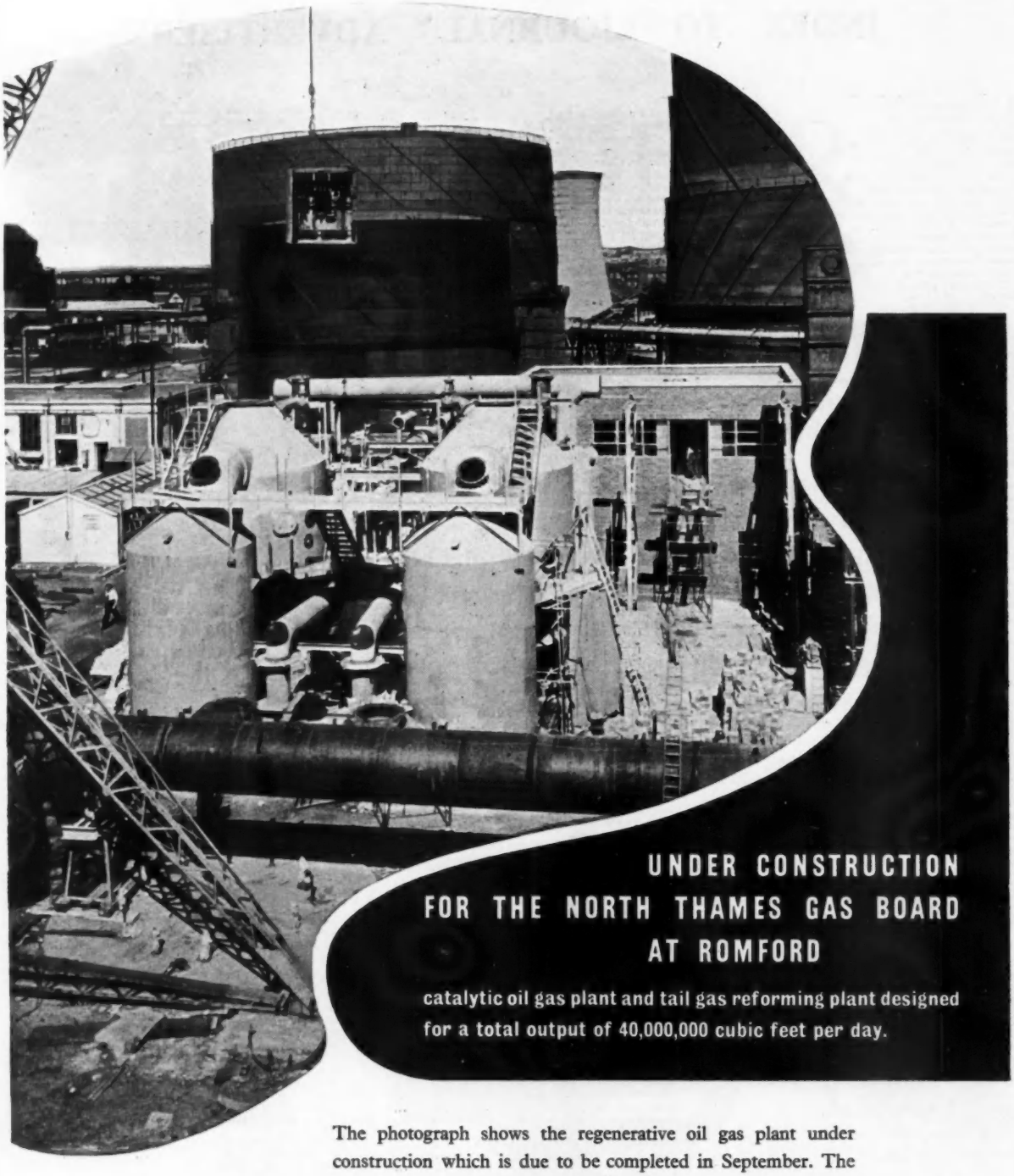

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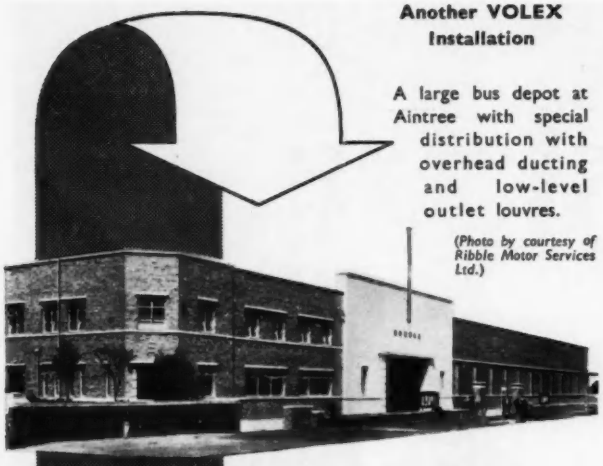

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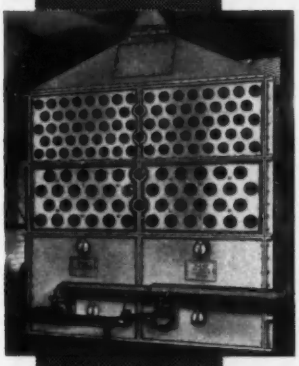

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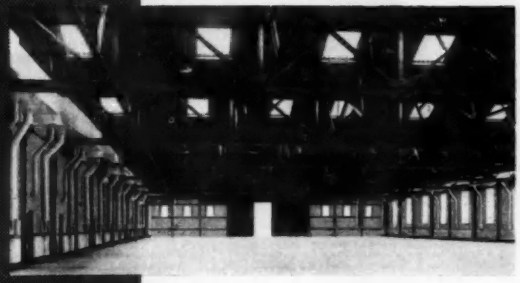

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Gas Journal

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109TH YEAR

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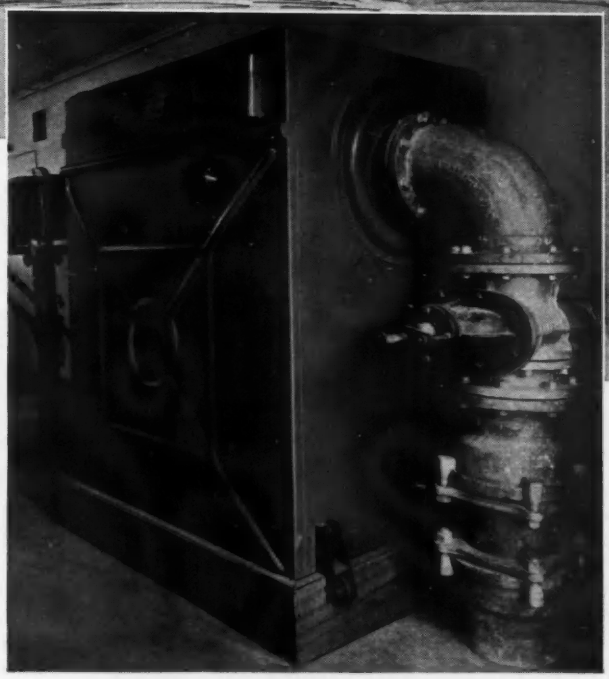

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Gas Journal

VOLUME 291. No. 4909. AUGUST 14, 1957. 109th YEAR

D.S.I.R Reports on Fuel Research

ONE of the most interesting reports of the year is that of the Department of Scientific and Industrial Research, a substantial document containing accounts of development work on such diverse subjects as the elimination of brake squeal and the enlargement of pigs' livers. Fuel matters are well represented in the comprehensive list of subjects covered, and among these work on air pollution is pre-eminent; efforts in this direction have been concerned both with measurement and with means of elimination. However, the sections of most interest to us are those dealing with domestic heating, freely-burning domestic coke, and gasification of coal and coke fines.

The examination of domestic heating appliances in accordance with the scheme for the recommendation of improved solid fuel-burning appliances for use in average dwellings has been proceeding at the Fuel Research Station at Greenwich and at the Scottish Branch at Thorntonhall. The work includes the examination of new appliances, and the re-testing to the standards of the New (1953) Schedule of appliances already on the List of Recommended Appliances issued jointly by the Coal Utilisation Council and the Solid Smokeless Fuels Federation. A substantial part of the second of these commitments has now been completed.

The study of openable stoves and of open fires has been continued in the calorimeter building with the primary purpose of obtaining their true efficiencies. The report states that for open fires (inset or freestanding) or openable stoves used with the firedoors open, the efficiency when burning coal at the full rate is only three-quarters of that obtained with coke. The loss in the case of coal is due mainly to the escape of unburnt gases up the chimney. Reducing the rate of burning increases the efficiency with both fuels, but the increase is greater for coal; similar increase in efficiency can be obtained by reducing the rate of flow of air in the chimney by introducing a chimney throat restrictor.

Earlier work having indicated that the efficiency of openable stoves when operated with the doors closed may be reduced markedly by leaks through badly-fitting doors, it was considered important to investigate this problem in more detail. A particular design of openable stove was chosen and the efficiency was measured in a calorimeter cabinet over a wide range of rates of leakage. The dependence of efficiency on leakage was found to be significant. It was concluded that it is desirable that a leakage check should be included as a routine in the inspection of stoves, although other design factors also influence efficiency, and a low value of air leakage does not guarantee high efficiency.

Work on the emission of sulphur gases from a domestic stove has shown that slightly more sulphur dioxide is produced from burning coal than from burning coke of similar sulphur content and more sulphur is retained in the ash residues from coke than from coal. Slightly more sulphur trioxide is produced from coke than from coal. Production of hydrogen sulphide from coke is negligible, and from coal is appreciable only when smoke is being emitted.

The report maintains that although ordinary gasworks coke will give a good smokeless fire when burnt on a modern 'improved' fire grate, 'it is not a popular fuel as a large fire with a deep fuel-bed has to be maintained to keep it alight.' It is quite unsatisfactory with the old-fashioned types of fire grate, of which there are still some 12 mill. in use. 'A big advance could therefore be made towards the abatement of smoke from domestic chimneys if large quantities of coke that would burn easily on such fire-grates could be made available for sale at a price little higher than that of ordinary coke.' Starting from the knowledge that coals of lower rank than those generally used for gas-making give cokes of greater reactivity, a survey has been made of a number of low-rank coals from the East Midlands coalfield, to find if any of them can be carbonised in normal gasworks plant to give a freely-burning coke with sufficiently high yields of sized coke, gas, and other by-products to make the process economic. Using plant of a type often employed in gasworks, it has been found that several of these coals give satisfactory cokes that burn easily in an old-fashioned grate, and that could be produced to sell at a reasonable price. It has been found that a coal with properties intermediate between these low-rank coals and the coals normally used for gas-making gives, on carbonisation, coke that will burn

better than ordinary gasworks coke, but with the advantage over the low-rank coals that the amount of gas produced during carbonisation is greater.

A significant section of the report deals with the gasification of coal and coke fines. Pointing out that small-sized coal of high ash-content is being produced in increasing quantities as a result of the mechanisation of mining operations, the report asserts that means must be found of using it instead of the scarcer and more valuable coals. One possibility is to develop methods of complete gasification that could utilise such coal. Earlier work at the station indicated that one simple method of using small-sized coal, namely of gasifying it in suspension in a fluidised bed, was not entirely successful. Work is now in hand to explore the possibility of gasifying finely-divided fuel by injecting it with air or oxygen through the tuyères of a gas producer containing large coke and working at a temperature sufficiently high for the ash to be removable in a molten condition, as slag. Finely-divided fuel injected with the blast into the slagging zone should be gasified rapidly to provide the main source of gas, the large coke playing the part of a supplementary fuel with the function of enclosing a hot zone for the gasification of the fines.

The Decision Game

TO assist in training top executives in America, the American Management Association have lately started courses for aspiring directors and company presidents to take part in what is called the 'decision game.' This is a very realistic form of training, a kind of T.E.W.T. so often used to test senior army officers' abilities in making tactical and strategical decisions, applied to long-term business forecasting based on the knowledge and ability of the business trainee to make use of market trends. So that the whole exercise may be as realistic as possible, stock book answers are not relied on, but an electronic computor works out the answers from information fed into it.

The procedure is to divide those taking the course into teams forming imaginary corporations. Each team will decide among themselves how much money to spend on production, marketing, research and development, new plant capacity and market research together with what price to charge for identical products. Each imaginary corporation starts with the same assets and same share of the market and tries to better its competitive position.

As in actual business the 'players' will be under pressure to make their decisions by imposing a time limit. A few hours' play would represent many years of company operation, but each team is confined to 'ten years' of operation and is only allowed 20 minutes to decide what changes to make for each quarter.

When each team has decided the spending policy of the corporation it represents, the information is filled in on the 'playing' form, the decisions are key punched on cards, and fed into the computor. The machine uses formulæ based on the principles of classical economics and calculates for each corporation the financial effects of its own and competitors' decisions. The computor used is the 1BM650 and as the results come out the machine an IBM407 printer prepares a quarterly operating statement, showing how much of the product has been sold and what its costs were.

The value of this 'game' is not so much as a means of scoring marks against a rival team or as a managerial testing device—as the American Management Association points out, it is difficult to allot individual scoring. But as a means of giving a management executive intensive practice in selecting vital facts, analysing them, and making decisions, it is superb. The players will have every opportunity of realising what a business in a very competitive market is up against and will, therefore, be able to organise their corporations' policies accordingly.

This seems an excellent way of demonstrating to the business executives of tomorrow the kind of conditions they are likely to be dealing with. But the system should be used primarily to teach students of higher management how maximum advantage can be taken from ideas and decisions based on their own experiences and background of business operating, rather than as a means of providing basic training.

Training Salesmen

THE training of salesmen, a matter which should be of vital interest to the gas industry, is the subject of a new publication by the British Institute of Management; this represents the findings of a study group representing eleven industries.

The booklet comments on the small number of courses available for the training of salesmen. These courses, says the report, 'serve a useful purpose in teaching novices the ABC of salesmanship. Usually they aim at creating the right climate in which a salesman can feel at home and develop. For salesmanship is not merely a question of skill, it is also a matter of mental attitude and most of these courses aim at developing this. Such courses are unfortunately few in number.' Little has been published in this country on the subject of sales training. Out of a bibliography of 17 books attached as an appendix to the report only four are British.

A company manufacturing weighing equipment 'looks for the three T's when selecting salesmen—toughness, tenacity and tact. Teaching in sales psychology is developed in the following ways: First men are taught that the prime essential is to be honest in the widest sense; second, representatives should listen rather than talk; third, they must watch the customer's remarks for a good lead-in; fourth, service must be given; fifth, a salesman with a good idea never lacks an audience; sixth, the customer should never be left in any doubt whatsoever, particularly as regards performance, price and delivery.'

'Salesmen,' the report states, 'usually delight in talking and demonstrating. This sometimes results in missing the right moment to clinch the sale.' A company manufacturing office supplies and equipment 'teaches its men to extract samples and material from their bag with their eyes closed. This leads to adroitness and avoids interrupting the interview with fumbling for sales aids.'

In a thorough examination of methods of sales training, the report emphasises three points: (i) It is not enough for salesmen alone to be trained. Everybody who comes into contact with customers should be considered as a possible subject for training; (ii) All training should be based on a formal analysis of the work to be done by the sales force—it is not sufficient for policy to be based on what the sales manager considers to be needed or what has been done in past years; (iii) The need for training is continuous—salesmen must be kept abreast of the latest developments in their fields.

Sales Training in Industry is obtainable from the B.I.M., 80, Fetter Lane, London, E.C.4, price 5s.

Personal

MR. F. J. PAINTER, Deputy Engineer for the East Midlands Gas Board at Doncaster since January, 1952, has been appointed Group Engineer at Grimsby. He left Darlington in 1942 to become Chief Chemist at Doncaster.

MR. HARLOW NOBLE, Deputy Publicity Officer with the Power-Gas Corporation, Ltd., Stockton-on-Tees, is leaving to take up an executive post with an advertising agency at Singapore.

MR. H. H. H. HELBY has been appointed General Sales Manager of the newly created industrial products division of the North British Rubber Company.

Obituary

MR. F. T. HATSWELL, who recently retired from the East Midlands Gas Board after 16 years in the gas industry, has died. After starting his career in the coke ovens industry, Mr. Hatswell was appointed Engineer and Manager of the Wombwell undertaking in 1941 and on vesting date was re-designated District Manager, Sales & Service, on the formation of No. 4, later Dearne Valley, District of the Sheffield and Rotherham Division of the E.M.G.B. On his retirement, he became representative of the gas section of Hattersley Brothers Ltd., of Swinton, Mexborough.

E.G.B. Drivers Win Safety Awards

SAFE driving awards of the Royal Society for the Prevention of Accidents were presented to 94 drivers at a recent ceremony by Mr. F. T. Brookes, Tottenham Divisional General Manager, Eastern Gas Board. Altogether 121 of the Board's drivers entered for the voluntary competition.

The outstanding recipient was Mr. Arthur J. B. 'Milky' Morgan, of the Willoughby Lane works, who received a second bar to a 35 years' safe driving cross. Last year Mr. Morgan was one of three drivers in the country to be presented with the first bar to the brooch, for 36 years' safe driving. He is due to retire in February.

For some years Mr. Morgan has been driving an eight-ton acid tanker. He began as a horse driver, and went on to steam wagons. He has been with the gas industry for 40 years this month.

Cheques Presented

Other outstanding awards were a 30-year brooch, three bars to a 30-year brooch, and four bars to a 25-year brooch. Mr. Brookes also presented £5 5s. cheques to seven drivers as the Board's award for five years' safe driving. Altogether 42 cheques have been presented since the scheme was inaugurated a few years ago.

Mr. Brookes stressed the importance of safe driving as part of public relations. Coupled with the appearance of the vehicle it was a point on which the public judged the Board. He had never seen better vehicles on the road than those of the Tottenham Division.

Please Don't Burn Our Houses Down

PEOPLE lay awake all night, children cried with terror, and dogs whined and howled as 30 ft. flames seared the sky turning the darkness into lurid, flickering light at Wath-on-Dearne, near Mexborough, recently.

But there was nothing to be frightened of really. It was just that certain Sheffield factories which normally use the surplus gas from the new Manvers Main colliery coke oven plant were closed for their holidays and as there was a big accumulation of gas which it was not practicable to store, it had to be burned.

This was the first occasion on which the gas breeder pipe on top of the 230-ft.-high coal bunker, part of a £10-mill. plant being built at Manvers, has been used full-time, which is why it caused a certain amount of alarm.

N.E.G.B. PAYS TRIBUTE TO ROYAL VISITORS TO SHOW

Pictured here are the exterior of the North Eastern Gas Board's stand at the Great Yorkshire Show this year and a tribute to the visit, on the second day, of the Queen and the Duke of Edinburgh. There was a record number of livestock entries and the attendance also was an all time record—120,080. The stand was designed and built by the Board's central display depôt.

CONTINENTAL GAS ASSOCIATIONS HOLD ANNUAL MEETINGS

Dual Function in Germany is Attended by 1,500

THE gas industry in Germany has two national bodies, the German Association of Gas and Water Engineers (D.V.G.W.) and the Gas and Waterworks Association (V.G.W.). The former is the professional and technical, and the latter the administrative and commercial organisation.

As their name implies they also serve the German water industry, although there are now relatively few engineers who are responsible for both gas and water undertakings.

In view of the dual nature of these two associations, their joint annual general meeting, held at Karlsruhe in June, produced a large attendance, totalling around 1,500 members. There were more than 30 foreign guests from some eight different countries, the Institution of Gas Engineers being represented by the Secretary, in the unavoidable absence of the President.

The first day was taken up with the formal business of the two national bodies, including, in the morning, two Presidential addresses, by Dr. H. Bausch (Berlin; D.V.G.W.) and Dr. H. Kaun (Stuttgart; V.G.W.) respectively and, in the afternoon, the other business of an annual meeting. The day concluded with a social evening.

Anniversary Celebration

The morning of the second day was devoted to the official celebration of the 50th anniversary of the foundation of the Gasinstitut at Karlsruhe. Introduced with music by Handel and concluded with a suite by J. S. Bach, both excellently played by the students' orchestra, the occasion was marked by addresses by the Rector of the Karlsruhe Technical College (Dr. Nesselmann), the Director (Dr. H. Pichler) and Professors (Dr. J. Körting and Dr. J. Holluta) of the Gasinstitut, and an interesting jubilee lecture on '50 Years' Training and Research at the Gasinstitut,' by Dr. W. Wunsch (Essen), in which particular reference was made to the pioneer work of Drs. Hans and Karle Bunte—father and son—both former Directors of the Institut. Plans were announced for the rebuilding of the Gasinstitut and for the formation of a Society of Friends of the Gasinstitut to help in financing the scheme.

After this celebration, the foreign guests were able to relax in an atmosphere of cordial informality at a luncheon given by the Councils of the two Associations, at which the Mayor of Karlsruhe was also a guest.

The afternoon's business consisted of a round-table discussion by a small group on 'How to meet the Future Heat Requirements of Western Germany,' followed by papers on 'Up-grading Coal and Gas Technology,' by Dr. Reerink (Essen) and 'Personnel Requirements for the technical development of the Water Industry,' by Dr. C. R. Baier (Dortmund).

The final day of the meeting was devoted to works visits, the places inspected including the Karlsruhe gasworks (coke ovens), the new Heidelberg gasworks (coke ovens), new water gas plant at the Freiburg gasworks, together with similar items of interest to the water engineers. Special visits for the ladies were also included in the programme.

Members Meet at the Hague for Netherlands Gathering

THE 82nd annual general meeting of the Netherlands Gas Association (Vereniging van Gasfabrikanten in Nederland) was held last month at The Hague.

The business sessions and some of the social functions took place in the Kurhaus, Scheveningen, the seaside resort two miles from the centre of The Hague. The Institution of Gas Engineers was officially represented by the President (Dr. J. Burns, G.M.) and Secretary (Dr. W. T. K. Braunholtz, O.B.E.), and delegates from several other foreign gas associations were also present.

The proceedings opened on the first evening with a civic reception in the historical Town Hall of The Hague, which the visitors had an opportunity of inspecting. The principal business of the meeting was arranged for the second day, when, at the outset, the President (Mr. H. G. van Veldhoven, of Eindhoven) made speeches of welcome to the foreign visitors in English, French, and German, to which the President of the Institution responded on behalf of the guests.

A sealed ballot was held for the next President of the Association and it was later announced that Mr. N. H. M. Tychon (Director of long-distance gas supply, Dutch State Mines) had been elected and would take office on January 1, 1958. The morning's business concluded with a paper by Professor G. Brender à Brandis on 'A Glimpse into the Chemical History of the 18th Century.'

In the afternoon, four more papers were presented—'The Development of Management-administration,' by B. Boer (The Hague); 'Some Problems regarding the Allocation of Expenses in Modern Management-administration,' by H. v. D. Horst (The Hague); 'The Method of reporting by the Management-administration to the Manager,' by Dr. S. C. Bersma (Schiedam); and 'Cost Price Structure and Tarification,' by J. v. Dam v. Isselt (Utrecht).

The morning of the third day was devoted to a visit to the Municipal gasworks of The Hague, under the management of Mr. E. H. Berkhuijsen. Features of particular interest were a bench of static vertical retorts in which the coke cooling chamber was only half the normal height, owing to considerations of space, and a new plant, just coming into operation, for the production of 450 to 500 B.Th.U. gas by thermal cracking of heavy oil or refinery gases (Ibing process).

A private visit was also made by the President and Secretary of the Institution to the offices and laboratories of the Gasinstituut der Vereniging van Exploitanten van Gasbedrijven (formerly the Gasstitchting) and to the offices of the Netherlands Gas Association, where they were received by Mr. J. G. de Voogd (Director of the Gasinstituut) and some of his colleagues and by Mr. J. H. Steinkamp (Secretary of the Association) respectively.

The official dinner of the Association was held at the Kurhaus Hotel with the President in the chair. The programme included visits for the ladies to see modern flats in the new districts of The Hague, the miniature town of 'Madurodam,' the world-famous art collection in the Mauritshuis, and the old Dutch house and garden of 'De Beukenhof' at Oegstgeest.

Clean Air Campaign

The coming North West clean air campaign is a concerted effort sponsored by the local authorities concerned in what is one of the largest 'black spot' areas in Britain. More than three tons of soot fall daily on every square mile in the black spot areas, doing incalculable damage to buildings, public health, vegetation, and livestock. The campaign will be inaugurated in Manchester at the beginning of September and will run throughout the winter, winding up at Liverpool in April.

Kitchen Display

The Council of Industrial Design is planning a special display of kitchens and kitchen equipment at the Design Centre in the spring of 1958. Scheduled to open on March 3, the display will consist of two fully furnished kitchens and two kitchen corners.

E.M.G.B. Opens a Show House in Sheffield

A HOUSE in Sheffield has been taken by the East Midlands Gas Board as a show house to show architects, local authorities, and the public, what can be done to make the most of property which, though structurally sound, is lacking in modern amenities.

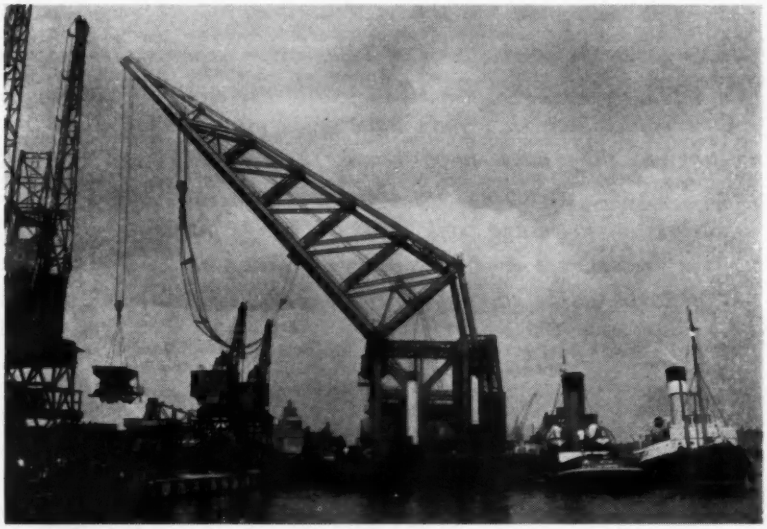
A typical terraced property, the house has been modernised throughout with the assistance of a council grant made under the Housing Repairs and Rents Act, 1954. It was opened on August 9 by the Lord Mayor and Lady Mayoress of Sheffield.

Of Great Interest

All the heating needs of the house are met by either gas or coke so that it is completely smokeless. This aspect will be of great interest to Sheffield people who are soon to have smoke-controlled areas within the city.

It will be open to the public, admission free, until September 4.

A CRANE TO LIFT A CRANE



The Southern Gas Board recently had to solve the problem of moving two cranes and two hoppers from an unsuitable coal unloading bay at Phœnix Wharf, Southampton works, to a new site. A gigantic 150-ton floating crane was hired for the job from Southampton docks. It is pictured here lifting one of the hoppers across from the old bay to the new unloading quay (centre, foreground), while the two tugs which towed it to the scene stand by.

Gas Universal in Edinburgh Flats

Gas is universal throughout the first of a series of big multi-storey flats being built by Edinburgh Corporation. Tenants of the flats at Spey Street, pictured above, have complete gas water heating, gas fired drying cabinet, and gas fire in the living room. Under the Edinburgh Corporation's 'freedom of choice' policy, tenants may opt for gas or electricity in cooking. But the signs are the vast majority are going in for gas. The Spey Street flats were officially opened last month by the Lord Provost of Edinburgh.

NEW CLEAN AIR BULLETIN

THE National Smoke Abatement Society is to publish, experimentally, a duplicated news bulletin called *Air Pollution News*. This will be issued as required and not at fixed intervals, and will give early information on clean air activities.

The bulletin will supplement the Society's quarterly journal, *Smokeless Air*.

Although it may become necessary to make a subscription charge, the bulletin will, to begin with, be issued without charge on payment of postages.

Higher Dividend

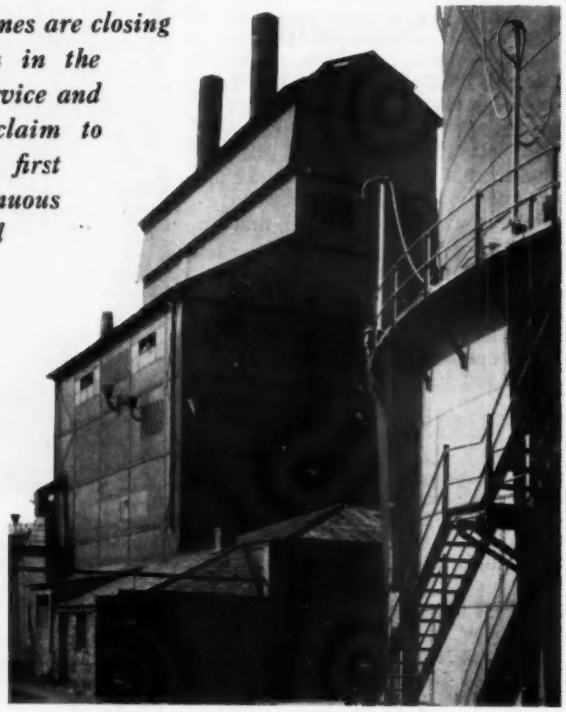
Final dividend of 10¼%, absorbing £45,895, on the Ordinary shares of United Gas Industries Ltd., is recommended for the year ended March 31, 1957 (against 9¼%, £43,096). Group profits after taxation amount to £127,516 (£236,429); carry forward is £150,360 (£123,591).

Correction

The West Midlands Gas Board, Wolverhampton and District Division, tell us that they inadvertently supplied incorrect details regarding the picture captioned 'Eight receive long service awards' which we published on p. 215 of our July 31 issue. In fact, Mr. G. H. Cooper, Mr. R. V. Jarvis, and Mr. H. Wallett, received the British Empire Medal.

REQUIEM FOR HELENSBURGH

Many gasworks in the path of integration schemes are closing and their passing excites little comment, even in the industry to which they may have given long service and in which they may have made their own claim to fame. Such a works is Helensburgh, the first undertaking to make sole use of the continuous vertical retort. This is the story of this small but historic works during its 110 years.



The Glover-West vertical retorts.

THE closing down of gasworks has become so much a commonplace since nationalisation, that the recent ending of gas production at the Helensburgh works passed almost unnoticed. Yet this 110-year-old undertaking made history nearly half a century ago as being the first works in the country to adopt the continuous vertical retort for the manufacture of all gas supplied to the communities served.

To the present generation it may seem strange that the action was then considered exceedingly venturesome, and was looked on as showing courage of a high order, or foolhardiness, according to the viewpoint taken. There was a universal interest in the outcome of the project and the Gas Manager of that time was overwhelmed with letters from all parts of the United Kingdom and abroad, asking for information regarding the results obtained and details of the experience gained.

The development of the undertaking from the beginning forms part of the development of the gas industry—a record of steady progress with occasional highlights. Gas was first manufactured in the Burgh in 1846 when a Company of local business people financed the erection of the works on a site which later was the subject of much dissension and bitter argument, as it occupied a central place in a residential town jealous and zealous of its amenities. The Company continued to operate the undertaking until 1899 when the Town Council adopted the Burghs (Scotland) Gas Supply Act and purchased the business.

Great Outcry

Among the first actions of the Town Council was the appointment of a new Gas Manager—Mr. William Blair from Haddington. Mr. Blair had learned his business through long experience, having spent all his working life in the gas industry apart from a period with the then prominent firm of gas plant constructors, Laidlaw Sons & Crane, engaged in the erection of gasholders and gas plant in Scotland and England. He proposed that ground be acquired on the fringe of the town for the erection of a gasholder and that the whole works should be gradually moved alongside. Immediately a great outcry arose in opposition from the householders in the neighbourhood, and a petition was signed demanding withdrawal of the proposal.

When the Council's Provisional Order came before the Court, the Sheriff decided in favour of the objectors, although, in his judgment, he stated that the Council had a good case but lacked public support. The Town Council's advisers had overlooked the fact that the number of householders immediately adjacent to the works far outnumbered those round about the new site and that they would gladly have supported a petition in favour of removal. Thus the works were condemned to reconstruction on their existing cramped site.

During the next three years the modernisation of the works was carried out with great vigour. The small holders were replaced by a new large one; new purifiers and purifier house were installed as well as an exhauster, rotary scrubber, meter house, and station meter; steam boilers with 80-ft. chimney, and fitters' workshops. The hand-charged horizontal retort plant was extended and altogether the works were improved almost out of recognition. When taken over in 1899 the output was about 40 mill. cu.ft. a year; by 1908-09 it had reached slightly over 60 mill. cu.ft. a year, and the question of new carbonising plant became paramount.

After considering Love's inclined retorts, Mr. Blair went to see the new Glover-West verticals at St. Helens and became an enthusiastic convert to their use. As a result an order for 16 retorts of .5 mill. cu.ft. per day capacity was placed early in 1910 with West's Gas Improvement Company. The contract covered the installation of the carbonising plant, an ample coal store and a railway siding into the works from the goods yard across the public street, necessitating the raising of the street level. Previously all coal had had to be carted from the goods yard some 300 yards away, though the cost of doing this was amazingly low, as the records of the early 1900's show. So keen was competition for the contract that the loading of the carts from the wagons and the transport was performed for 4½d. per ton—there were no leisurely tea breaks in those days!

The extension was made possible by the fact that some time before, the Council had acquired land alongside the Clyde shore on which to erect a gasholder at some future date. The Education Authority, being in need of ground on which to build a new elementary school, offered to exchange for this land the school and playground which occupied a part of the square containing the school and the gasworks, the gasworks site forming an inverted L with the short leg below the school. The exchange was effected without any monetary consideration and the vertical retort plant and coal store were built on the site of the school. The total cost was about £15,000, of which £6,000 was provided from accumulated reserves. The plant went into operation in July, 1911.

One unlooked-for result was that immediately a storm of protest came from consumers who, accustomed to high candle-power gas, found that a larger volume of the new gas was required to produce full illumination from incandescent burners, and to provide heat for cooking and other heating processes. Hundreds of protests about increased gas accounts

poured into the office and the Manager's life was not a happy one. The trouble was gradually ended by careful systematic attention to consumers' appliances, some lowering of price, and the use of high-grade coking coals to give the greatest possible candle-power.

At the outbreak of the first world war gas output had increased to a little over 70 mill. cu.ft. per annum, and at that figure it remained more or less stationary throughout the war. After the war, the demand for gas and gas appliances of all kinds bounded upwards and ten years later annual gas production had reached more than 171 mill. cu.ft. During 1927-28 the price of gas was 2s. 1d. per 1,000 cu.ft. Progress during the next ten years was much slower, but the 200 mill. mark was passed in the financial year 1937-38 and the price of gas had then been for three years 5.23d. per therm, with discounts of up to 20% for larger consumptions. That price was not only one of the lowest in the United Kingdom, but enabled the undertaking to compete with Bath for the highest sales per domestic consumer.

During these years of swiftly advancing sales the works plant was extended and improved. The retorts were rebuilt in silica materials; the overhead coal storage hoppers were enlarged; the mechanical discharging of coal wagons was modernised; and new purifiers, washing plant, steam boilers, and an additional gasholder of .5 mill. cu.ft. per day capacity were installed. The distribution mains system was amplified by the laying of new trunk mains from the pressure governors at the works and duplicating the mains in the principal streets, besides the provision of larger mains in many of the less important streets and in the landward area of gas supply.

Street Closed

The provision of the new holder once more roused angry opposition. The Council had purchased land about 400 yards from the works for the purpose, but on this occasion retreated before the opposition without a struggle and adopted an alternative proposal to close part of a street connecting two main thoroughfares. The ground landlord agreeing to the proposition, the gasholder was erected in 1929-1930 on the site thus made available. This must be one of very few cases of a public street being closed to allow the erection of gasworks plant.

In 1937 new showrooms and offices were completed on a corner site formerly the coal store of the old horizontal retort house. This handsome two-storey building with reconstructed stone facing has greatly enhanced the appearance of the street corner and is considered one of the most graceful and commodious buildings of its kind in Scotland. The showrooms and public office are on the ground floor, with a demonstration and lecture room and private offices on the upper floor.

Electricity as a public supply did not reach the Burgh until 1927, but despite vigorous competition form a low tariff for electricity, the output of gas continued to increase steadily and in 1947 reached a peak at 240 mill. cu.ft.

After the last war a chronic scarcity of labour and the difficulties of the cramped site had been accentuated by the growth in demand for gas. During the war demand had been met and difficulties of gas manufacture overcome by the fortunate circumstance that a carburetted water gas plant had been installed in the summer of 1939. The time had arrived for a minute examination of everything that concerned the future of the undertaking.

In 1947 integration of gas undertakings had come into favour and the Town Council, taking into account the strong public objection to a gasworks in the heart of a residential town, and the almost insuperable difficulty of obtaining a suitable site in or near the Burgh, decided to open negotiations with the Dumbarton Burgh Council for a bulk supply of gas from their works. The circumstances were all in favour; the Dumbarton works had an ample site and were then considering the installation of additional carbonising plant—to make the addition larger than intended was a simple matter—and their mains were only some four miles from Helensburgh. Negotiations were opened and proceeded amicably; a general agreement had been reached when the Government announced its intention of nationalising the gas industry. The consultations between the Councils thus came to an end, but contracts had already been placed for the plant proposed—now, eight years after nationalisation, fruition of the plans made by the two Town Councils has come about.

When taken over, no Chancellor of the Exchequer could say of the Helensburgh gasworks that the nation had secured a 'poor bag of physical assets.' On the contrary, the take-over was a first class bargain for the nationalised gas industry. The outstanding loan debt had been reduced to less than £20,000, a nominal figure for a works of the size, and the works were in excellent order. Right to the last day in June on which gas was manufactured, it could be claimed with complete justification that the working results retained a proud position among the lowest cost producers in the Glasgow Division, which comprises 54% of the whole output of the Scottish Gas Board.

It is good to know that items of the plant such as purifiers, gas washers, exhausters and boilers will be dismantled and go into commission elsewhere.

Three Gas Managers covered almost 100 years of the undertaking's existence under Company and Municipal control. William Smith was the Company's Manager for close on 50 years. William Blair, whom some of the older gas people will remember, was Manager from 1899 to 1915. He was a man of great personality and large frame, whose spade beard and stentorian voice made him a notable figure at all meetings of the gas fraternity. David Fulton, who succeeded him, retired on the nationalisation of the works in 1949 and is still resident in the town.

If the Managers stayed put the same cannot be said of the young men who had part of their training at the works and acted as Assistants to the Manager. Several have achieved important positions in the industry—one may mention Mr. Alexander Jamieson, until recently Manager, Western Scotland Group of Undertakings, Scottish Gas Board; Alexander Tran, after service at Bath and Reading, General Manager to the Oxford Gaslight Company and allied undertakings, and on nationalisation, General Manager, Oxford Group of Gas undertakings, Southern Gas Board; William Campbell, Engineer and Manager at Galashiels, and later Engineer and Manager, Paisley; David Beavis, who left to become an Assistant Engineer at Cambridge and is now General Manager of one of the four Divisions of the Scottish Gas Board, that of Edinburgh and South East Scotland. Others, if less prominent, occupy good positions.

This review of the Helensburgh gas undertaking is necessarily incomplete, but the tale is sufficiently full to indicate that its history has not been without event, and that though a small works, it has contributed something to the progressive welfare of the gas industry.

Coal Utilisation

THE need for a research and development programme into the use of coal as vigorous as that now undertaken in the atomic energy field was emphasised by the President, Dr. W. Idris Jones, C.B.E., in his address at the Annual General Meeting of the British Coal Utilisation Research Association, 1957, reported in its recent *Quarterly Gazette No.* 31. His review of the Association's activities during 1956 outlined the scope of the researches undertaken during the year, including continued efforts to improve the efficiency of industrial and domestic coal utilisation through work in the laboratory and by investigations in the field. Also featured were the development of instruments and techniques for the measurement of smoke and dust emission in connection with the clean air legislation, and basic research into the chemical constitution and physical structure of coal. The President foresaw the possibilities of the basic research providing important future developments in the use of coal as a source of chemical products, although the inflationary trend had limited work in this field.

Among other features of this issue were a brief description of the work of the research establishment of the French coal industry—the Centre d'Etudes et Recherches des Charbonnages de France (CERCHAR)—whose Technical Director-General, Mr. R. Cheradame, will deliver the Sixth Coal Science Lecture of the B.C.U.R.A. in London on October 16. 'The Performance of an Overfeed Coking Stoker Burning ½ in.-0 Smalls,' an article based on a paper recently presented to the Institute of Fuel by M. V. Murray, Superintendent of the Association's boiler department, and 'Industrial Flames,' a short account of the work of the International Flame Research Foundation.

WHITHER ELECTRICITY?

THE COMMERCIAL LOAD

By 'Thermopile'

WHEN the gas industry relinquished the lighting load in shops and offices they left the door open to electricity to pick up a handsome income. It is true though that for a time they continued with a considerable business in outside shop lighting. One sees few outside shop lamps to-day, while the few that remain are electric, yet 50 years ago nearly every shop had some kind of light to illuminate the windows from above and behind the viewer. They were largely gas lamps. Even 'parade' lighting which was so successfully fostered by the old 'South Met.' Co. in London has entirely disappeared. Better street lighting, no doubt, killed all forms of outside shop lighting. It not only made outside shop lighting unnecessary but oddly enough it also helped to raise levels of illumination inside shop windows.

Between the wars electricity gradually took over shop lighting and made the illumination of display into an art. Neon and other gaseous discharge lights for signs and fascias also brought additional load to the mains. Late window lighting has become general in every town as the extra current consumed only costs on an average about ½d. per 100 watt lamp per evening.

The fuel and power crisis in 1947, however, came too soon after the war-time black-out to prevent any quick postwar recovery of shop window lighting. In subsequent years a number of large departmental stores all over the country began to realise that if they wanted to avoid power cuts they were better off if they generated electricity themselves. Shop lighting in departmental stores is a steady load lasting from opening to long after closing time. Oil engine generators could produce electricity cheaply if the waste heat could be put to use for central heating and hot water supply. This is in fact exactly what happened and millions of units per year have been lost to the grid. It will not recover this load for many years to come. It is true, however, that in some cases mains electricity is used during the summer in these stores where an attractive off-peak tariff can be obtained. This enables the diesel plant to be shut down for an annual overhaul.

Has the gas industry failed to notice the possibility of selling gas for 'dual fuel' engine generators in these places? This was done successfully at the Bath and West Agricultural Show at Swindon this summer where diesel engines have generated all the electricity required by exhibitors for several years and supplied abundant free hot water to anyone who wanted it. It would be in the best interests of the country for a home produced fuel like gas to be used rather than imported oil.

No Advantage

Private generation of electricity is, of course, of no advantage to the smaller shopkeeper, some of the difficulties at least being lack of space and the labour and attention which the plant requires. This also applies to heating plant to a certain extent.

Electricity is beginning to tackle the problem of heating shops and offices where space is at a premium. Space, incidentally, has a monetary value. Even the omission of a furnace chimney shaft in a big office block adds so many square feet of floor space to the total available for rental. If the building is let on a basis of so much per square foot the space saved by the elimination of a tall chimney shaft in a multi-storey building together with space for boiler and fuel storage represents additional accommodation available. If direct heating by electricity or flueless gas appliances is installed the rental received from the extra space available offsets any higher cost of running.

In a large city the office lighting, heating and power load is certainly lucrative. Modern steel frame buildings lend themselves to variation in floor lay-out and from time to time frequent alterations are made. Walls are shifted, rooms are enlarged or divided. The electrical engineer can only cater for all possibilities in future years by running his cables in underfloor ducts. Quick alteration of wiring or additions are easily possible without disturbing the flooring.

Then there is the question of heating. Even where central heating is provided it is general to provide auxiliary heating for cold spring and autumn days. Something portable is preferable so that the arrangement of office furniture, filing cabinets, etc., is not impeded by the presence of a fixed heater on a wall. What type of appliance is chosen in such cases? Paraffin convectors would be cheaper than gas or electricity to run but someone has to look after them and fill and clean them regularly. What about gas? Is it worth running gas mains in a modern office block for this kind of load? If desulphurised gas was supplied and used in flueless appliances it would offer cheaper heating than electricity. The gas industry let this load go when gas lighting went out of the office. And with it went the commissionaire's gas ring for making the twice daily 'cuppa,' except in cases where the basement now houses the staff canteen.

The power load forms an increasing percentage of office block demand. More and faster lifts are required. Forced ventilation or air conditioning is needed especially in underground offices, and then there are the various services—automatic house telephones, staff locators, addressing machines, and all the complexity of mechanical accountancy. As time goes on electronic computers will join the staff and there is no end to the tasks they can perform.

Possibilities Increasing

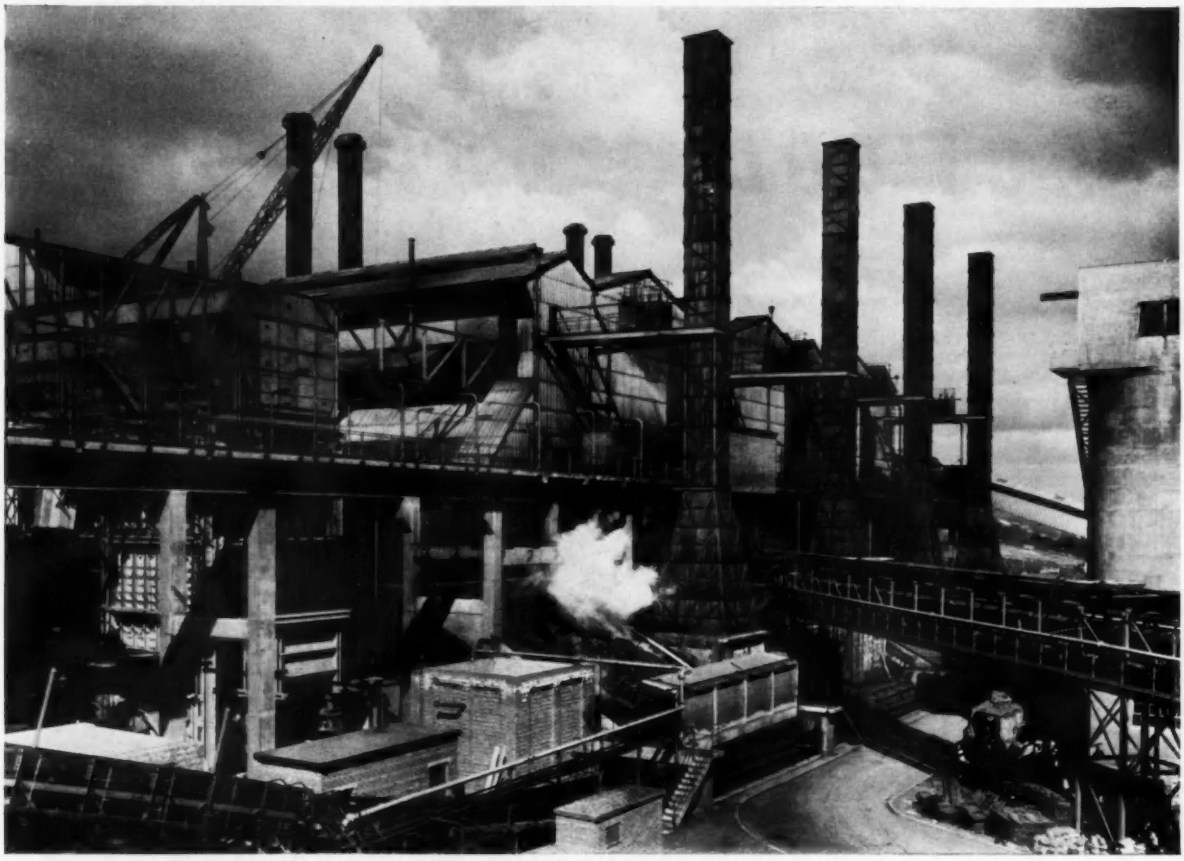
These are the opportunities afforded to electricity to increase the commercial load and the possibilities are increasing. The standard of lighting in some buildings is now so high that even wth fluorescent lighting the total lighting load contributes a fair amount of heat to the building itself. Every 300 kW. of lighting in fact brings with it 1 mill. B.Th.U.'s of heat. In new buildings electric floor warming is now being considered as worth while when capital maintenance and running costs are taken together. Floor warming is being tried out in public garages where the ever-open doors make any hot air system a costly business. In older premises off-peak 'block' storage heaters are being installed, the chief advantage being low capital and installation cost as they carry no purchase tax and are easily fixed. Hot water central heating would be impossible or costly to instal in such cases.

What the gas industry lost in lighting it made up to a considerable extent in the installation of commercial cooking as more and more offices provided canteen facilities for their staffs. The electrical industry is already picking up some useful business, both here and in restaurants and cafés, etc., especially in the preparation of snack meals on the counter.

Yet in some directions little has been done by the electrical industry to cultivate loads like water heating and steam-raising in commercial premises. Where the former is carried out on the storage principle the capital cost of the electrical installation is usually lower than the gas equivalent. Running cost is often in favour of gas where a commercial tariff applies but as so often happens, capital cost is not always taken into account as well, which could alter the over-all picture of costs.

Not much has been done either in the direction of steam raising. For small intermittently used plants such as those found in valeting businesses the electrode boiler has already shown some promise. It can raise steam from cold in a matter of minutes. When the boiler is shut down the very small quantity of water left in the boiler and the absence of pilot ignition means that stand-by losses are negligible, and it is started and stopped by a push button.

The electrical industry no doubt has much on its hands in other directions in connection with the commercial load but one day it will turn its attention to new possibilities such as these. In the meantime there is plenty of electricity to be sold for lighting purposes and every kilowatt connected makes it possible to sell ten kilowatt-hours of off-peak current to somebody for night storage heating or the charging of electric vehicle batteries.



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PURIFICATION OF COAL GAS

using Static Beds of Iron Oxide

By R. J. S. THOMPSON, M.Inst.Gas E.,
Head of the Chemical Engineering Division, W. C. Holmes & Co., Ltd.

The removal of hydrogen sulphide from coal gas is still carried out mainly by using static beds of iron oxide. It is generally agreed that this process remains the most satisfactory one and the cheapest for the degree of removal which is required. At the same time different authorities have emphasized that the process is capable of considerable improvement. It is hoped that the observations made below may indicate ways in which the process may be further developed.

IT is not proposed to describe any particular plants in detail, but rather to deal with certain aspects of the process. The discussion is based mainly on tower purifier operation, but much of it applies to any type of purifier using static beds.

The overall reactions are the two following ones:—

(1) $Fe_2O_3 + 3\,H_2S = Fe_2S_3 + 3\,H_2O$.

(2) $2\,Fe_2S_3 + 3\,O_2 = 2\,Fe_2O_3 + 6\,S$.

Both reactions take place with the evolution of heat.

In the sulphiding reaction the fixing of 1 gram of hydrogen sulphide liberates 0.147 KCal, and in the oxidising reaction a further 1.425 KCal are liberated per gram of original hydrogen sulphide.

It is proposed to describe what happens in a normal set of purifiers (particularly towers) in the light of the above reactions. For this purpose normal conditions are assumed, i.e., atmospheric and inlet gas temperature about 15°C., hydrogen sulphide in gas 500/700 grains per 100 cu.ft., oxygen in inlet gas about 0.5%, and so on.

First Taker

Let us now consider a set of six towers which have just been 'swung,' and assume that the temperature of the first taker is also about 15°C. Also assume that the tower is active, contains a normal amount of moisture, and that first taker air admission is practised. Sufficient air will be admitted over and above the 0.5% oxygen in the inlet gas to oxidise all the H_2S in the inlet gas to water and free sulphur.

Being active and newly in the first position, the box will remove substantially the whole of the hydrogen sulphide from the gas immediately after swinging. Its removal efficiency will probably be over 90% and may exceed 95%, this being quite common. In addition, the bulk of the sulphide produced will be oxidised in that tower, so that almost the full heat of the combined sulphiding and oxidising reactions will be developed in it.

Calculation will show that the temperature of oxide in the tower and the gas temperature leaving the oxide bed will rise 2°C. or 3°C. per hour from the initial 15°C. The actual rate of temperature rise will depend on several factors such as the weight of oxide in the tower, its water content, specific heat, and so on, as well as the other data stated above, but will be of this order. Practical observation confirms this.

Now the amount of water produced in the reaction is more than sufficient to saturate the gas at the temperature at which it leaves the oxide during the early stages after swinging. The gas will generally need to leave the oxide at 6°C. or 7°C. above its inlet temperature before it can carry away the whole of the water developed in the reaction at the rate at which it is produced. The temperature of the oxide and of the gas leaving the oxide will not have risen 7°C. for several hours after swinging. It follows, therefore, that during this first period there will be a deposition of water in the oxide in the tower. This period will normally last three or four hours.

The second period will now commence. The oxide and gas temperature will continue to rise and the gas will carry away all the water produced in the reaction, and will also remove water from the oxide. Eventually all the water deposited during the first period will have been removed. When this point has arrived period two can be said to have ended. It can be shown that this period lasts a few hours.

Period three now commences. So long as the tower remains in first taker position, not only will the gas carry away all the water produced in the reaction, but will also remove moisture from the oxide itself, over and above that which was initially deposited in it by the reaction. In other words, the oxide is drying out during period three, and losing water which it contained when charged to the purifier.

Eventually an equilibrium is set up. The temperature of oxide and gas leaving it cease to rise, and water is lost from the tower at a steady rate. The longer the tower remains in this position, the more moisture is lost by the oxide. If, therefore, the towers are not swung for a considerable period, there will be a considerable loss of water from the tower in the first taker position.

Loss of Activity

Another phenomenon now commences. It is common experience that any box or tower in the first taker position gradually loses efficiency if kept in this position, however active it had been first switched in. This fall in efficiency can be attributed to several causes. One of these may well be the continued loss in moisture while the tower is maintained in this position. It should not be overlooked that the longer the tower is kept in first taker position, the more drying out occurs, and the greater is the possibility of local overheating.

Another cause may well be that the superficial layers of available iron oxide become fouled due to the fact that oxidation lags behind sulphiding, and there is reason to think that this may be the main reason. This will be cumulative and of increasing importance as time goes on. It would be reasonable to assume equally that the superficial layers of moisture on the grains of purifying mass are also those removed during the drying out referred to

above, and that such superficial drying may occur throughout the whole of the bed, although internally the grains of purifying mass may contain reserves of moisture and available unsulphided iron.

Preventing Loss of Activity and Moisture

The considerations discussed above lead immediately to a method of preventing loss both of activity and moisture. The proposal is simply to swing the purifiers at a much earlier stage than is the present practice. The best time to swing would appear to be as near as possible to the end of the second period described above. That is, remove the first taker from that position as soon as the temperature rise of the oxide and gas is such that the moisture which has been carried away by the gas is equal to that produced up to that moment by the reaction. In the general case briefly considered above the time to swing would be after a tower or box has been in the first taker position for six or eight hours. It can be worked out for any particular case. If the time has been chosen correctly the first taker should have maintained high activity during the whole of the period, and should have lost little or no water from its original content.

Furthermore, the boxes down the line will be called on to do very little work as the bulk of it should be done in the first taker. Also, the second taker, having been switched from first taker position while still active, should for all practical purposes complete the purification. It should be possible to establish a mode of operation if the correct switching position is chosen, so that there are three or four towers or boxes clean at all times.

Recovery of Activity of Towers 'Down the Line'

It is well known that when a tower has occupied first taker position, and is then rotated and passes down the line, its activity is restored to a greater or less extent.

There are several explanations of this. One is that time is given for the oxidation reaction to be completed and for all the iron to be made available again. There is also time for migration to take place, superficial sulphur migrating to the centre of grains of purifying material, and iron oxide to the surface.

It is not unreasonable to suppose that if the purifier unit has been maintained in the first taker position for a long time, the sulphide layer on the particles is thicker. It is also possible that this skin has been heated to a temperature, locally, much above the average. It follows that revivification will therefore be more difficult than if the unit had been left for a shorter time on first taker position so that the unoxidised 'skin' is thinner.

Even if oxidation were complete before swinging, a time would be reached when the surface of all grains were covered with free sulphur and access to the iron oxide would be impeded. Activity would be reduced and the unit would need to be taken out of the first position to allow migration to take place. If this reasoning is correct, there should be a definite advantage on this score also for not keeping any unit in the first taker position too long.

Practical Evidence in Favour of Frequent Swinging

It is significant in the first place that many installations where difficulty has been experienced in purification due to one of many causes—high atmospheric temperatures, unusually high sulphur content of the gas, heavy loading, etc.—relief has been obtained by increasing the frequency of swinging. The frequent swinging has usually been dropped as soon as conditions have been improved.

A not infrequent case arises when a box needs changing, or is being worked up that extra few percent. The installation can often be kept going by swinging twice a day for a week or two. The fact that relief can be obtained in this way is a clear pointer to the fact that frequent swinging has definite advantages. If it helps to keep an installation going in difficult circumstances then it is not unreasonable to believe that it should maintain the installation in better condition at any time.

It is not common for works to make regular tests on the hydrogen sulphide content of every box or tower at intervals throughout the day, but in one case extensive records exist of the inlet and outlet concentration of each tower in a six tower installation, taken every two hours throughout the day and night. The installation is normally swung every day. These records show that on the average the efficiency of any tower in the first taker position two hours after swinging is high. Up to six or eight hours after each swing the removal by the first taker remains quite high, and has fallen to a relatively low figure after some 16 hours or so when it settles down for the rest of the 24 hours. The inference is that had the towers been swung after eight hours or so the efficiency would have been maintained continuously at a high figure. The efficiency of the tower in the second taker position would also have been high to the benefit of the whole installation. It is just these two towers which should have a high efficiency if purification is to be comfortable.

Final Working Up of the Sulphur Content of a Particular Box

In some works it is the practice to keep the unit which is being worked up for sale in the first taker position for several days, even if daily swinging is the normal procedure. When nearly fully sulphided, such a unit very quickly loses activity in the first taker position with the result that the additional sulphur picked up during the second and third day is proportionately very small. It is not uncommon for such a unit to have an activity of 80% or so for a few hours after being put in first taker position, but the activity falls to 40% or less after a further few hours.

This unit would actually benefit if the period which it is left in first taker position were reduced and the installation swung every shift or so, such that the unit to be worked up would be in the first taker position only while its activity is still high. By continuing to swing the installation every shift or so for a number of days, the total amount of additional sulphur picked up by the particular unit might well be increased, without endangering the final purification of the gas.

Effect of a 'Rest' Period on Oxide

In the discussion above it has been stated that purifiers which have been in the first taker position and have lost some efficiency, regain it during the time they are in second, third, and fourth taker position (and in fifth and sixth also if there are five or six purifier units). Possible reasons for this were given.

A fact of some significance in this connection has recently been observed in the laboratories of Messrs. W. C. Holmes & Co., Ltd. Experiments were being carried out on different varieties of pelleted oxide of very high activity for trace removal of hydrogen sulphide. One particular experiment had progressed several days and had reached the 'break-through' point when the experiment had to be stopped for the weekend. It was desired to follow the course of the experiment further the following week, and the apparatus was closed up tightly over the weekend. When the experiment was continued, it was found that the oxide could now take up a considerable additional quantity of hydrogen sulphide before the break point was again reached. The experiment was stopped, the apparatus closed up and allowed to stand again. Once more, on restarting a further substantial quantity of hydrogen sulphide was absorbed before the 'break-point' was reached. The important point to note is that the gas being purified contained no oxygen at all, and no air was able to enter the apparatus during the rest period.

The experiment was repeated, extra care being taken to ensure that no oxidation took place at any time during the experiment, and the results were confirmed. Finally, an experiment was carried out using normal commercial purifying material, with a similar result.

The significance of the experiments is that oxide can benefit from a rest alone without any revivification with oxygen.

No further experiments have yet been carried out to decide why the particular phenomenon takes place, but a suggestion is that transfer of sulphide was taking place continuously from the outside of the pellets or grains of oxide to the inside and, conversely, oxide was being transferred from the inside to the outside.

Whether moisture takes part in the phenomenon, whether a process of diffusion ions through the moisture or some other reaction is the cause is unknown, but most readers will immediately be reminded of Avery's migration theory which postulates the transfer of sulphur from the surface of grains to the centre. It should be noted, however, that in the case described above free sulphur was absent, and migration could not be sulphur as such. It has been shown by Dent and Moignard (ref. GRB.52) that migration takes place best when fouling and oxidising are carried out separately and not simultaneously and that the presence of moisture is essential.

There may well be some connection between the phenomenon observed above and 'migration' of sulphur. Be that as it may, the experiments do indicate the benefit derived by oxide from a 'rest.' The writer suggests that frequent rests after relatively short exposures may well have a greater effect than rests after long exposures and heavy fouling.

Work of Swinging Purifiers

When a normal installation of purifiers is swung six valves have to be operated, three closed and three opened. Under any circumstances this is a fairly considerable undertaking. In addition, it is a responsible matter since an error can lead to serious results. Consequently purifiers are usually swung at a favourable time, during the day and under supervision. If valves with chain wheels are used the work becomes even more arduous, and with hydraulic valves takes a considerable time.

If frequent and regular swinging as advocated above is to be used, some assistance must be given to the operators, and if possible swinging must be made foolproof. This can now be done. The whole operation of swinging a set of purifiers is reduced to selecting the change desired on a panel and pressing a button. This operation then takes place automatically and is complete in a few minutes.

A complete set of safeguards ensures that if any operation is not completed correctly the process is stopped and an appropriate signal is given. This system eliminates manual operation of valves altogether, makes swinging very rapid and eliminates all reasonable risk of error. The cost is not excessive for a large installation and the advantages are considerable.

Alternatively, normal mechanical valves can be power assisted at a very small cost. On a new installation the additional cost for this scheme is negligible and is particularly useful for large valves. With this system a man has to attend to each valve separately, but all hard labour is eliminated and closing or opening of a valve becomes a matter of a few seconds instead of several minutes.

Air Admission

Most modern installations of purifiers are arranged so that air for revivification can be admitted at the inlet to any or every box or tower whatever the sequence.

Second taker air admission was advocated very many years ago and some 30 years ago a patent was taken out combining second taker air admission with preheating the gas at the inlet to the second taker. This particular process was tried out at that time at a works in England, but sufficient advantage was not found to justify the expenditure or supervision involved. Many works have since tried second taker air admission, and while some engineers claim that they have derived advantage from it, it has generally fallen into disuse so far as the writer has observed.

The discussion at the beginning of this article was based on first taker air admission. If second air admission were practised, very similar arguments could be used to justify frequent swinging to obtain the same advantage.

While on the subject of air admission a significant matter should be noted, which was reported by Bairstow (see GAS JOURNAL, May 1, 1957, p. 249). He found on a set of box towers using second taker air admission, that shortly after swinging the oxygen absorption was almost complete for several hours. This seems to be a matter that deserves further investigation. Is it possible that, using second taker air admission, the moment when the oxygen began to rise is the moment to swing the purifiers in accordance with the ideas set out above? If this is so, it would be possible to control the swinging of the purifiers by noting the oxygen content of the outlet gas on a continuous recorder. The air admitted would be reduced so that the total oxygen in the inlet gas was equal to that required for oxidation of the hydrogen sulphide, and in consequence the outlet gas was substantially free. This is a very serious thought and deserves proper investigation.

Conclusion

The above discussion could have been extended considerably. Working data could have been quoted to support the proposal to swing purifiers much more frequently than is normal, and the figures quoted could have been substantiated by actual calculations. The writer believes that those concerned with purifier operation will easily find ample evidence in support of the proposals if the matter is looked into carefully.

Briefly, it is believed that swinging of purifiers, particularly towers of any description, should be made at least once a shift, this being chosen rather as a convenient time period than because it is ideal. The best cycle may well be more frequent in many cases.

The possible advantages are:—

(a) Better sulphur content of spent oxide.
(b) Higher sulphur content of spent oxide.
(c) Longer periods between changing the oxide.
(d) Greater loading of plant.
(e) Lower inerts content of purified gas, particularly oxygen and nitrogen.
(f) Ability to purify gas with higher hydrogen sulphide content.
(g) Possible reduction in size of plant and capital cost.
(h) Spent oxide easier to handle.

It cannot be predicted how far any or all of the above advantages may be realised, but the evidence collected shows that they may be considerable.

It should not be overlooked that if the ideas have any merit and prove correct to any great extent in practice, considerable changes may be possible in purifier design and practice.

Industrial Catering in the 'Guardian'

A four-page supplement on industrial catering which graced the July 30 issue of the *Manchester Guardian* had a strong gas slant. A first-class half-page Gas Council advertisement set the pace and gas equipment manufacturers were also represented. Mr. D. J. Cottam, of Stotts of Oldham, contributed 'A History of Industrial Catering' and other articles deal with meals for dock workers, dish-washing, plastics, staff restaurants, etc.

CONTRIBUTION TO THE STUDY OF INTERNAL CORROSION

under different pressures in systems of transport and distribution of purified town gas as a function of content of water vapour carbon dioxide and oxygen

by MM. J. MORLET AND C. GEOFFRAY

Research Engineers in the Research Department, Gaz de France.

THIS communication is a continuation of our report at Strasburg in 1955 on our work relating to the corrosive action of certain constituents of town gas on the mild steel used in the construction of mains and pipes employed for the transmission and distribution of the gas. That research was carried out with synthetic gases made up from nitrogen, carbon dioxide, and oxygen, with or without water in the form of vapour or liquid. At the end of this first phase of our work we were able to formulate certain provisional conclusions, but further factors remained to be determined:—

1, The evolution of the corrosion of steel in an atmosphere of synthetic gas saturated with water under the influence of significant variations in the surrounding temperature.

2, Whether our observations relative to synthetic gases could be transposed to purified town gas.

3, The influence of temperature on the speed of attack on the steel in an atmosphere of saturated town gas.

4, The influence of pressure on the evolution of the corrosion phenomena under examination.

From a paper given at the 74th Conference of the Association Technique de l'Industrie du Gaz en France at Bordeaux.

The results of the work on these points form the subject of the present communication. We will examine first the corrosion in saturated atmospheres with considerable variations in ambient temperature. The work on the corrosion of steel in a gaseous atmosphere which we had previously undertaken had shown the primordial role played by water in the evolution of corrosion; they had also demonstrated the difficulties in obtaining reproducible results with super-saturated atmospheres, particularly when the amplitude of the variations in ambiant temperature was considerable.

A somewhat different method was therefore developed in which test pieces were exposed to corrosive action in a stream of a known synthetic gas saturated with water vapour. By abrupt variations of temperature in the gas used, the precipitation of a film of relatively large and homogeneous amounts of condensation was caused on the steel plates in reproducible conditions.

Apparatus used consisted of a rectangular container in cast-iron 20 mm. by 20 mm. by 40 mm., coated with a paint unaffected by the conditions of the test and fitted with a movable cover, placed on two metallic supports inside an outer vessel of zinc of similar shape, 35 mm. by 40 mm. by 55 mm. The cover was fitted with a tube leading the gas used to about 3 cm. from the bottom of the container and with an exit tube. The zinc vessel was provided with five electrical resistances of 250 Ohms at 127 Volts contained in quartz tubes.

At the beginning of each test the container was cleaned, 2.25 litres of distilled water were poured into it, and four test pieces of steel were suspended vertically on a glass support in the inner container. The cover was then placed in position and secured by two cramps. Vacuum was maintained for several minutes in the container in order to eliminate the air present and the oxygen dissolved in the distilled water. The vacuum pump was then stopped and the vacuum broken by the arrival of the gas to be examined. After a purge of some minutes the ingress of gas was regulated to several litres per hour and maintained at that figure during the whole cycle of corrosion.

The temperature of the bath was then raised to 50°C., this taking about 2¼ hours. The hot water was then evacuated through a large outlet at the base of the outer vessel, and immedately replaced by water at a temperature of about 0°C., as a result of which the test pieces became covered with a homogeneous layer of condensation. Three cycles of temperature per day were effected in this manner. A given number of days (N) after the beginning of the test the container was opened and the extent of the corrosion of the test pieces determined.

To increase the intensity of attack on the metal, while continuing in the determined operating conditions, a series of experiments was undertaken using as corrosive fluid a synthetic gas relatively rich in oxygen. We sought thus to determine, on the one hand the reliability of the method and on the other the characteristics of the curve of corrosion against time. The gas selected was CO_2, 4.5% by volume, 0_2, 3%, N_2 the remainder.

The test pieces corroded in this gas were covered with a black pellicle well keyed into the metal, and by a product of corrosion only slightly adherent, the colour of which varied between rusty chestnut and golden yellow. Results of a large number of tests show that:—

1, The amounts of corrosion determined, other things being equal, are absolutely reproducible as long as the duration of the test is limited to 24 hours.

2, As the time increases, the rates of corrosion are more and more dispersed. The probable curve representing corrosion as a function of time shows, after a linear start, a deflection towards the time axis.

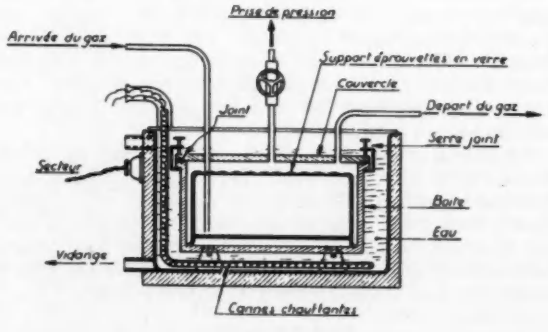

Figure 1.—Box for tests of rapid corrosion: Arrivée du gaz, gas inlet: prise de pression, pressure gauge attachment; support éprouvettes en verre, glass support for test pieces; couvercle, cover; joint, joint; départ du gaz, gas outlet; serre joint, clamps; secteur, to switch; boîte, box; eau, water; vidange, drain pipe; cannes chauffantes, heating coils.

It may be deduced that:—

a. In the presence of relatively large condensation, resulting from variations from high temperatures, the steel test pieces become covered with products of oxidation which, at the beginning, do not protect the metal.

b. As this layer thickens its protective action appears to be more and more marked, and though it does not become completely effective, it explains the growing dispersion in the results when the duration of exposure is prolonged.

The evolution of the attack on these metallic test pieces may approximate in some degree to the evolution of corrosive attack on the internal sides of gasholder plates. These are, indeed, subject in the course of some days to variations of temperature less abrupt but as great if not greater than those of our test, which would favour phenomena of alternating condensation on the steel surfaces. The circumstances in which this 'breathing of the metal' occurs are indeed different from those of our test, but it is reasonable to suppose that the effects are analogous.

The above procedure may be described as a test of rapid corrosion. It makes possible an evaluation of the resistance to corrosion of any given steel in a relatively short time and in well-defined conditions—and consequently a comparison of the particular metal under test with other known metals already tested.

We had already shown that in a saturated gaseous atmosphere, variations of temperature being small, the layer of products of corrosion forming on the metal protects it almost completely from further attack. Our new observations tend to prove that in similar conditions, but with the gas submitted to considerable variation in temperature, the rust layer has the effect of retarding the rate of attack on the metal without arresting it completely.

Role of Condensation

Summing up, it may be concluded that, generally, in the presence of a gas containing water vapour:—

1, Attack on the steel appears only when temperature variations in the gas are such that aqueous condensation occurs on the metal.

2, The layer of products of corrosion formed in that case may be protective in certain circumstances.

This protective effect is a function of the magnitude of the condensations; it is almost complete if the quantity of water deposited on the corroded steel is insufficient to get through to the metal, it is only partial in the contrary case, becoming practically nil when the steel is completely covered with water.

Tests were next carried out to determine the corrosive action of purified town gas. In order to secure a supply of gas of constant quality and in sufficient quantity to carry out several series of successive tests, we stored under pressure of about 150 atm. some dozens of cubic metres of ordinary town gas in steel bottles. The gas was absolutely free from compressor oil and virtually free from dust, gums, oxides of nitrogen, cyanic acid, ammonia, and a great part of its benzole. The dew point of this gas, at normal pressure, was about −10°C.

We deemed it unnecessary to experiment again with two types of steel in each series of tests, our previous work having revealed the identical behaviour of the two steels used. The observations given below therefore relate to the steel 'Ugyperval' only. We will discuss first corrosion in the presence of liquid.

The appearance of the evolution of the phenomena of corrosion of mild steel in the presence of town gas was the same as that observed in the presence of the synthetic gases previously used. Certain of the results obtained were also identical. We determined, indeed, that in a humid atmosphere in experimental conditions analogous to those previously described, the corrosive power of town gas at normal pressure is, other things being equal, proportional to time and to its oxygen content.

On the other hand, our experiments showed that, contrary to what we had observed with the synthetic gases, the rate of corrosion is practically independent of the CO_2 content of the town gas. Numerous tests carried out with different gases and the two varieties of steel at our disposal have definitely confirmed this result.

Turning to corrosion in the presence of gases, several tests following the method of continuous weighing, previously described, have led to the following observations:—

1, Corrosion by town gas takes places only in the presence of condensed water,

2, When condensations are small, attack on the metal ceases almost completely as soon as it is covered all over with a layer of the products of corrosion.

3, When the condensations are medium, the protective action of the deposit is only partial.

4, If the condensations are abundant, the attack goes on in spite of the layer of rust with which the metal is covered.

These results are exactly similar to those observed with the synthetic gases. Under these circumstances, it appeared to us to be logical to extend to purified town gas our conclusions concerning synthetic gases without the necessity of studying further the corrosion of steel in the presence of considerable aqueous condensations. All our conclusions relative to the study of the corrosion of mild steel at normal pressure by synthetic gases, except the rôle played by CO_2, apply to purified town gas.

Considering the rôle of temperature, the temperature of gas mains may vary over pretty wide limits acording to time and the ground in which they are laid. Overhead pipes and gasholders in particular are subject to very variable temperatures in the course of the year and even of the day. For these reasons it appeared interesting to investigate the influence of temperature on the corrosive power of town gas, other things being equal.

Tests on rapid corrosion had already given us a view of the evolution of the corrosion of sheet iron submitted to the action of a synthetic gas charged with water vapour in conditions of varying temperatures. We completed these by tests of corrosion in a humid atmosphere in the presence of town gas at normal pressure and at different temperatures.

A series of results with a gas containing 3.5% CO_2 and 1% O_2 showed that attack does not grow appreciably when the temperature varies from 0° to 25°C. Above this temperature, however, the rate of corrosion rises very rapidly as the temperature increases.

In France the network of long distance transmission mains is extending more and more. It is probable that within a few years the length of mains carrying gas under pressure will undergo considerable expansion. An investigation of the corrosion of the steel used in the construction of these mains by town gas under pressure seems, therefore, to be of particular interest.

Bottled Gas

The town gas used came from the bottles of compressed gas already described. To effect several series of tests with gas of the same type a sufficiently large number of bottles were charged simultaneously. The tests of corrosion in liquid were conducted in the same way as those previously carried out at normal pressure, the dessicators being replaced by metallic boxes resistant to pressure.

Inside the outer receptacle was placed a crystallising vessel and in this the glass supports for the test pieces were placed. It was eventually filled with distilled water. We had six similar piece of apparatus each connected with a bottle of compressed gas through metallic tubes and a pressure-reducing valve and gauge. The flow of gas through each set was regulated to about 8 litres per hour by means of a needle valve in the outlet pipe.

We thought it reasonable to proceed in the first place with investigations into the corrosion of mild steel immersed in liquid, since our previous experiments had shown that in the absence of condensed water, attack was practically nil. We determined in these conditions successively the influence of time, pressure, oxygen, and carbon dioxide.

As we pointed out in our previous communication, the curves of corrosion against time must be established first, since they indicate whether the products of corrosion adherent to the metal have a protective effect or not. It is then possible to determine the time to be given to the tests to show the effect of the other variables.

We had originally carried out tests of corrosion in relation to time under 10 kg pressure with a gas containing 3.4% CO_2 and 0.8% oxygen. The results having indicated a straight line relation for a time of exposure prolonged to 400 hours, we had concluded that it would be sufficient to run tests of short duration to determine the influence of the other factors. Later,

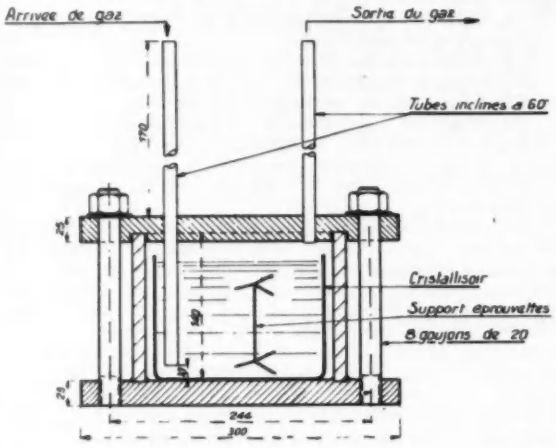

Figure 2.—Pressure apparatus: Arrivée du gaz, gas inlet; sortie du gaz, gas outlet; tubes inclinés à 60°, tubes inclined at 60°; cristallisoir, container; support éprouvettes, support for test pieces; 8 goujons de 20, 8 bolts 20 mm. dia.

when a number of experimental results of tests of longer duration had appeared to be systematically 'aberrant,' we were led to reconsider the question and to carry out further tests. The total results obtained have shown that:—

1. In a general way curves of corrosion against time, initially straight, afterwards bend towards the axis of time.
2. The period during which the rate of corrosion remains proportional to time decreases as the partial pressure of the oxygen present in the gas under test (P, total × % O_2) increases. At the same time, the speed of attack grows with the partial pressure of the oxygen.
3. During their exposure to the corrosive agent chosen, the test pieces become covered gradually with a layer of the products of corrosion which thickens with time. This deposit adheres very little to the base metal, being dislodged with a simple blow; it nevertheless protects the metal partially when it attains a certain thickness and is responsible for the bending of the corrosion/time curves.

We verified this latter point experimentally by dislodging, in the course of the test, by means of violent shocks in the metal container, the layer of rust on the test pieces and comparing the rate of corrosion obtained with that in the same circumstances in the absence of such shocks.

In these conditions, we set out to determine the optimum duration of the tests to determine the rates of the other variables. There were two possibilities—to carry out comparative determinations within the times occupied by the straight-line relation, or to prolong the tests over the parabolic portion of the curves.

In the case where the partial pressure of the oxygen would be small we should be led, if we chose the second solution, to undertake a series of experiments which might be prolonged over several thousand hours, which appeared to be prohibitive. We therefore chose the first solution and fixed at 100 hours the duration of our tests. It is possible that the results we obtained in these conditions are not exactly similar to those we might have obtained with the second method, but we think that the laws which can be deduced will be representative of the phenomena under consideration. It may even be that the method adopted is the more correct. The products of corrosion present in the mains are, indeed, submitted to the mechanical effects of the passage of the gas, particularly if piston scrapers are used there is therefore little chance that they can grow sufficiently to form a protective coating without continuity.

Each series of tests was carried out by continuously feeding the various experimental boxes with the same gas, but under a different pressure. After 100 hours, they were cut off and the amount of corrosion of the testpieces was determined.

We carried out by this method, a certain number of tests of decreasing and increasing with the object of determining simultaneously the rôles of pressure and of oxygen. We were thus able to draw a family of curves relative to the same gas in which, during one series of tests, the oxygen content only was varied. The operating conditions were as follows:

	Gas I	II	III	IV
Town gas with CO_2% by volume	3.5	3.5	3.5	3.5
Town gas with O_2% by volume	0.50	1.00	1.45	2.85

Temperature 26-27°C.

An examination of the curves leads to the following conclusions:

1. As far as can be seen, in a saturated atmosphere of town gas, the corrosion of mild steel increases with the pressure. The slope of the curves, initially very sharp, decreases as the pressure rises to become virtually constant. Tests carried out up to 60 kg per sq. cm. confirm this.
2. The general slope of the curves is more accentuated as the oxygen content of the gas is raised.

By cutting the previous curves by straight lines parallel to the axis of the ordinates it is possible to determine directly the corrosion effect of the gas as a function of its oxygen content, for any given pressure. Further, to control the value of the results thus obtained, we ran several series of tests feeding under the same pressure each of our boxes with a town gas identical with that formerly used more or less enriched with oxygen. The curves determined corroborated the accuracy of our former results.

From these observations we conclude:

1. With saturated town gas, other factors being equal, including pressure, corrosion of mild steel is proportional to the oxygen content of the gas.
2. The slope of the curves representing this phenomenon becomes steeper as the pressure of the gas increases.
3. All these lines, except that corresponding to atmospheric pressure, appear to converge towards the same point on the axis of ordinates, which seems to indicate that for a gas not containing oxygen, corrosion is virtually independent of pressure. As the partial pressure of CO_2 grows in the same proportion as total pressure, this observation would equally indicate that even under pressure, the corrosive action of purified town gas depends little upon its CO_2 content, at least above a certain pressure lying between 1 and 4 kg per sq. cm.

Observations Confirmed

In order to determine directly the corrosive action of CO_2 we found experimentally the curves relating corrosion to CO_2 content, other factors being kept constant. The results confirmed our previous observations that in a liquid medium, other factors being equal including pressure, the quantity of corrosion of mild steel appears to be independent of the CO_2 content of the town gas under test.

The whole of this work on the corrosive action of purified town gas, under different pressures, leads to the following conclusions:—

In a *wet medium*, other factors being equal—

1. If the layer of products of corrosion remains thin, attack on the steel is proportional to time; as soon as this layer attains a certain thickness it protects the metal slightly, but this protection is never complete.
2. The attack is a direct function of the oxygen content of the gas.
3. The attack appears to be independent of CO_2 content, at least within the experimental limits, 3% to 15%.

In a *gaseous atmosphere* and at whatever pressure—

1. Corrosion is inappreciable in the absence of condensation.
2. In the presence of slight condensation the products of corrosion protect effectively the under-lying steel. This protection becomes less effective as the quantity of condensation increases.

It would appear, therefore, that it is possible to reduce considerably the corrosive effect of purified town gas either by limiting its oxygen content, or by dehydrating it to the point where no condensation of water vapour could be produced during its stay in the transmission main.

This second, simpler, and more efficacious method is currently used, but it is possible that in the years to come other concurrent techniques, such as inhibitors and protection by internal coatings, may be found more economical in certain cases.

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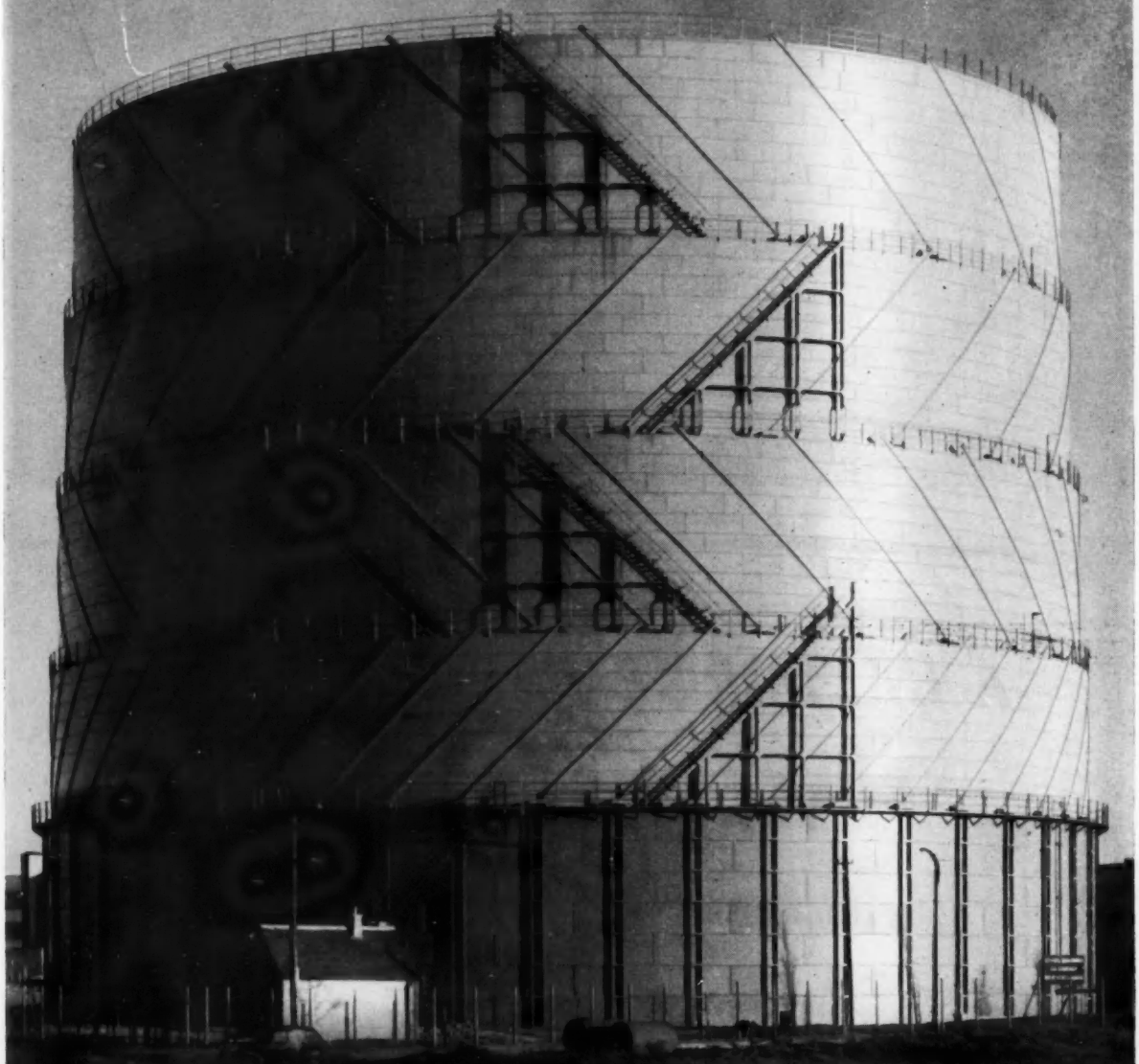

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The **NEW WORLD** Convector No. 460 is essentially a background heater, particularly suitable for installation in large rooms, halls or shops. Handsome in appearance, the heater lends itself extremely well to two-colour treatment.

The **NEW WORLD** Convector is flueless and may be connected to gas from either side in any convenient position.

The outer casing and front panel are finished in a choice of colours — see below — whilst the expanded metal grille and lighting hole are chromium-plated.

All Gold
Gold outer case with cream front

All Bronze
Nubian outer case with cream front

Height: 26 in. **Width:** 18¼ in. **Depth:** 5⅜ in.
Gas Rating: 7,500 B.Th.U/hr.

Newcomer to the Cole Range

DESIGNED to lift 45 tons at 12 ft. radius with a 50-ft. jib, the latest and largest addition to the Coles range of cranes is the rail-mounted model R5010 'Samson' pictured here. It is manufactured and marketed by Steels Engineering Products Ltd.

The power plant consists of a 100 h.p. diesel prime mover driving a shunt-wound generator, which in turn supplies current to separate motors for each of the four crane motions of hoist, derrick, slew, and travel.

The stopping of any motion is instinctive, as the lever is spring loaded to return to its 'off' position; and automatic electro-mechanical brakes take control immediately the current is interrupted, either intentionally or accidentally.

The chassis frame, of extremely robust construction, is mounted on two bogies each with four single flange steel wheels and driven by two separate electric motors. The standard jib is a strut type of lattice construction made in two sections of combined total length 50 ft., which can be extended to 80 ft. by the use of extension pieces.

When fitted with standard jib, the R5010 weighs approximately 84 tons and has a shunting capacity of 400 tons when working on a straight level track.

A radius indicator shows at a glance the safe working load for the jib radius and any tendency to overload is immediately corrected by the Coles B & A safe load indicator, a fully automatic safety device. Totally enclosed self-resetting limit switches provide an automatic safeguard against overwinding, overlowering, and derricking beyond the prescribed limits.—*Steels Engineering Products, Ltd., Crown Works, Sunderland.*

BRITISH CHEMICALS

The 1957 edition of the Association of British Chemical Manufacturers' Directory, 'British Chemicals and their Manufacturers,' is now available. This edition is an extension of previous publications in the series and contains over 12,000 products named systematically and in accordance with British Standard 2474:1954—'Recommended Names for Chemicals Used in Industry.'

Copies are available free of charge to all persons or firms genuinely interested in the purchase of chemicals.—*The Association of British Chemical Manufacturers, Cecil Chambers, 86, Strand, London, W.C.2.*

TRADE NEWS SUPPLEMENT

Inspection of Welding

MAPEL have recently made an addition to their comprehensive welding inspection equipment and now offer an immediate X-ray service for workshop or site examination of welding.

Using the latest Fedrex 160 kV as X-ray set, with 360° beam, circumferential welds in vessels and pipes are more conveniently inspected with greater speed and definition at one exposure, greatly increasing the rate of inspection of weldments.

The maximum penetration with this set is 1½ in. of steel and provides an invaluable addition to the Mapel inspection service of welding inspection, visually, radiographically (using both gamma ray and X-ray methods) and by ultrasonic examination.—*Metal and Pipeline Endurance Ltd., Artillery Mansions, Victoria Street, London, S.W.1.*

Coolant Valve for Water Cooled Diesels

EASILY INSTALLED, TOUGH, SENSITIVE

A NEW coolant valve, The 'Waxtrol,' has been produced by Teddington Industrial Equipment, Ltd., to meet the demand for a reliable thermostatic valve which will be insensitive to pump pressure, easily installed, capable of retaining its calibration permanently, and require no service.

Embodying powerful wax-filled elements, the 'Waxtrol' has been designed for use with the largest diesel engines in marine, traction and stationary plants, where the cooling systems operate at high pressures.

A special wax of such a composition that a change in state occurs at the operating temperature is sealed in a container in the operating element. This change of state results in a rapid increase in volume and power output. The expansion of the wax actuates the valve unit by extruding a flexible plug into a reduced diameter in the piston housing thus magnifying the movement of the piston which overcomes a return spring and moves the valve upwards against a fixed seat.

The inlet port is connected to the inside of the cylindrical valve and the coolant is passed either over the top of the cylinder to the by-pass, or under the cylinder to the heat exchanger.

No adjustments are necessary to the 'Waxtrol' and the only maintenance required is occasional cleaning of the interior. Entirely self-contained the valve needs no external source of power.

Available in sizes from 1¼ in. to 4 in. with a wide choice of temperature range, the 'Waxtrol' can be simply fitted to any existing plant.—*Teddington Industrial Equipment, Ltd., Sunbury-on-Thames, Middlesex.*

This Year's Safety Week Slogan is 'GUARD YOUR HANDS'

SLOGAN of this year's National Industrial Safety Week—September 30 to October 5—is 'Guard Your Hands.' Each year the Royal Society for the Prevention of Accidents organises a safety week during which special attention is directed to the reduction of industrial accidents or to a particular aspect of the problem.

These and other activities of the Society have done much to reduce human pain and hardship and, by saving production hours, have contributed to the prosperity of the country.

In selecting the theme for the 1957 campaign the Society was influenced by the appalling number of accidents that occur every year to persons engaged in handling goods. For example, in 1955, 44,613 persons were involved in handling accidents *in factories alone* out of a total of 163,332 reportable factory accidents.

As in the past, the 'Guard Your Hands' campaign will be directed mainly at managements, who during the week will be asked to do everything possible to encourage their employees to work safely—and particularly to look after their hands.

To assist organisers of local campaigns the Society has prepared a comprehensive range of publicity material which will be identified by an attractive little figure in red tunic and bearskin—'Sergeant RoSPA.'—*Royal Society for the Prevention of Accidents, 38, Millbank, London, S.W.1.*

Introducing the New World Convector 460

HANDSOME BACKGROUND HEATER

THE New World convector No. 460 is specially designed for use as a background heater in large rooms, halls and shops. Its handsome proportions and individual styling make it particularly suitable for two-colour treatment.

The outer casing and front panel are of pressed steel sheet, the latter being fitted with a chromium plated expanded metal grille for discharge of combustion products and a chromium plated brass lighting hole mask. The simple lines and polished finishes ensure that the New World convector requires a minimum of cleaning.

High Heat Output

The design of the combustion chamber and surrounding air passages together with the careful selection of burner jets, permit a high heat output to be obtained while the surface of the appliance remains very cool, a factor which enables it to be installed close to walls without risk of damage or discolouration.

The New World convector, which operates fluelessly, can be installed in any convenient position and is easily fitted as the gas connection can be made on either the right or left-hand side. Fixing is quickly done by means of screws which pass straight through the base into the floor.

The nominal gas rate is 7,500 B.Th.U. per hr. The burner unit comprises a fixed loading governor and a small casting carrying two Bray jets type No. 191. The jet sizes are selected to suit the local gas group and no adjustment is required.

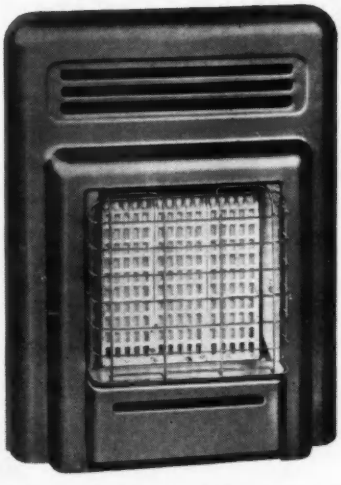
The overall dimensions of the heater are 26 in. high, 18¼ in. wide, 5¼ in. deep. The New World convector is available in gold, bronze, gold outer case and cream front, and nubian outer case and cream front.—*Radiation Group Sales, Ltd., Radiation House, 7, Stratford Place, London, W.1.*

New Ways of Estimating Humidity

IN biological work it is often desirable to have a measure of the atmospheric humidity in small spaces or crevices, and this may be conveniently estimated by means of specially prepared cobalt thiocyanate papers and permanent colour standards against which the colour changes in these papers may be assessed. The staff of Tintometer Ltd. has collaborated with Mr. M. E. Solomon of The Department of Scientific and Industrial Research, Pest Infestation Laboratory, to produce permanent colour standards for use with the Lovibond comparator, and suitable papers impregnated with cobalt thiocyanate have been produced by the British Drug Houses Ltd.

These papers are also suitable for determining humidity against surfaces which may not be in moisture equilibrium with the atmosphere, for example, concrete floors; also within masses of stored grain, and in similar situations.—*Tintometer Ltd., Salisbury.*

'FLAMBOROUGH' GIVES WARM AIR QUICKLY



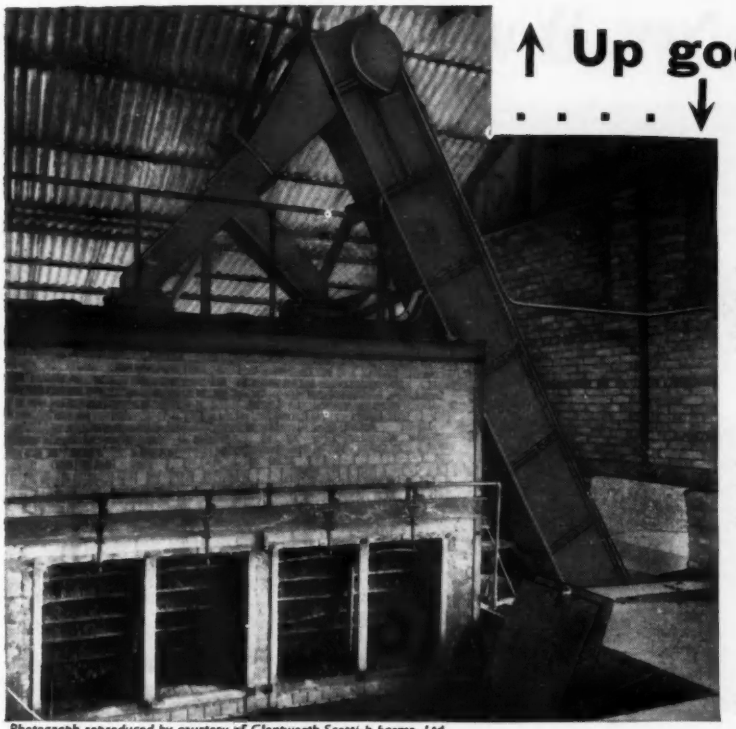
A NEW Bratt Colbran product which gives convected heat in addition to the usual radiant warmth, at no extra cost, is the 'Flamborough' convector radiant gas fire. Cool air from the room is drawn in beneath the fire, warmed, and sent out through the grille at the top.

With most convection systems there is a noticeable time lag between lighting the fire and convected heat becoming available. The 'Flamborough,' however, incorporates a new feature in convector gas fire design whereby warm air is circulated much more rapidly, and a cold room is soon pleasantly warm.

The safety guard conforms to the Heating Appliances (Fireguards) Act, 1953. A governor is fitted to ensure economy in gas consumption during periods of pressure variation.

Height of the heater is 26 in.; width, 19 in.; depth, 5¼ in.; height of flue spigot, 19 in. Minimum space for fixing is 19¼ in. by 12 in. wide.

Rated heat input is 18,000 B.Th.U. per hr., equivalent to a full-on (or maximum) gas consumption of 36 cu.ft. per hr. (CV. 500). Finish is stove enamelled bronze, pewter or gold, with chromium-plated guard.—*Bratt Colbran, Ltd., 10, Mortimer Street, London, W.1.*



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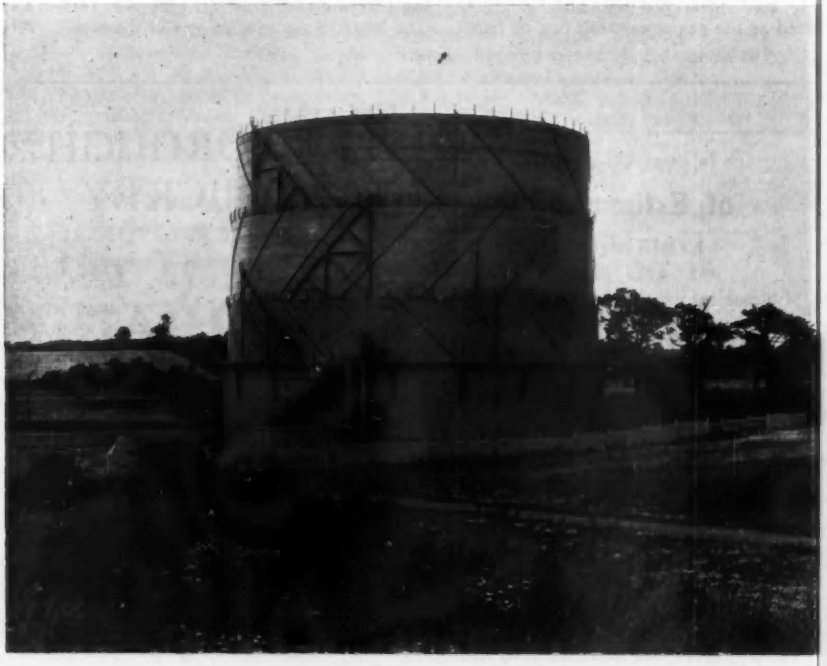

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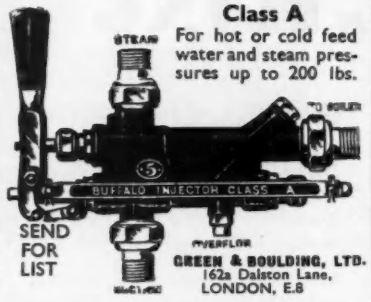

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EAST MIDLANDS GAS BOARD

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APPLICATIONS are invited for the position of SHOWROOM MANAGER the Friar Gate Showrooms, Derby.

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The salary payable will be within grades A.P.T. 7/8 (£705-£825) of the National Salary Scales.

The post is pensionable and the successful applicant will be required to pass a medical examination.

Applications giving full details of age, education, qualifications and experience, together with the names of two referees, should be addressed to reach the undersigned not later than August 24, 1957.

K. L. PEARCE,
Divisional General Manager.

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Applications stating age, present position and perience, together with the names of two refe should be submitted not later than August 24, to—

Divisional General Manager,
Gas Offices, Millstone Lane, Leicester.

WALES GAS BOARD

FITTER

VACANCY exists for a suitable FITTER experience in gasholder maintenance, general works machinery, and installation of gasworks pl The applicant must be willing to reside near Cardiff and be prepared to travel within the Boa Area.

Subsistence and travelling allowances are p Rate of pay in accordance with the National J Industrial Council of the Gas Industry.

Applications, stating age and details of experie together with the names of two referees, should addressed to the undersigned to arrive within four days of the appearance of this notice.

Wales Gas Board,
Technical Headquarters,
Grangetown,
Cardiff.

F. RICHMOND,
Mechanical Enginee

SOUTHERN GAS BOARD

CHEMIST

APPLICATIONS are invited for the post CHEMIST at the Board's Central Laborato at Poole, Dorset.

Applicants should have a University Degree or equivalent in Chemistry, and previous experience the Gas Industry would be an advantage. appointment will be within Grades A.P.T. (£745-£960 per annum) and the starting salary be dependent on the qualifications and experienc the successful applicant.

The successful candidate will be required to pa medical examination and, unless already subject t pension scheme by virtue of the Gas (Pension Rig Regulations, 1950, will be required to join Southern Gas Board Staff Pension Scheme.

Applications, to be made on special forms to obtained from the Personnel Manager, Southern Board, 164, Above Bar, Southampton, should returned upon completion by September 2, 1957.

APPOINTMENTS VACANT

NORTH WESTERN GAS BOARD

HEAD OFFICE—TECHNICAL AND PLANNI DIVISION
PRODUCTION ENGINEERING ASSISTANT

APPLICATIONS are invited for the above p sionable appointment which offers good pr pects to a keen young engineer. The commenc salary will depend upon the qualifications and perience of the successful candidate.

Applicants should have had experience in the or fuel industries, and possess either a Chem Engineering qualification or a qualification in Engineering, together with a knowledge of chem engineering fundamentals.

Detailed applications, giving the names of referees, should reach the Secretary, N.W.G.B., Whitworth Street, Manchester 1, within fourteen da

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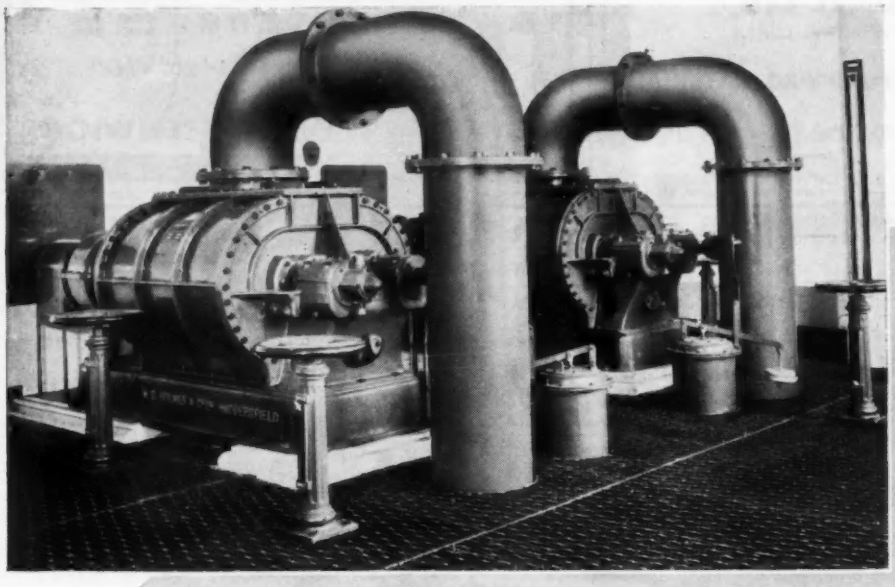

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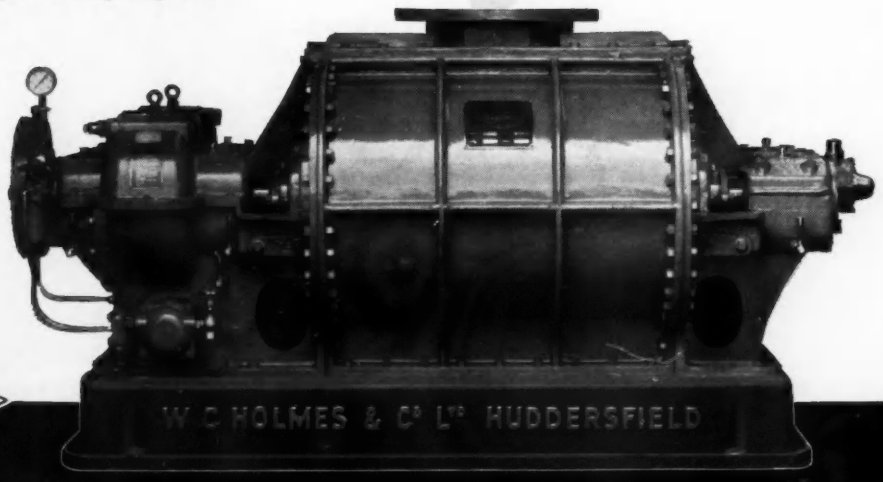
Full details in Publication No. 36/5



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in one

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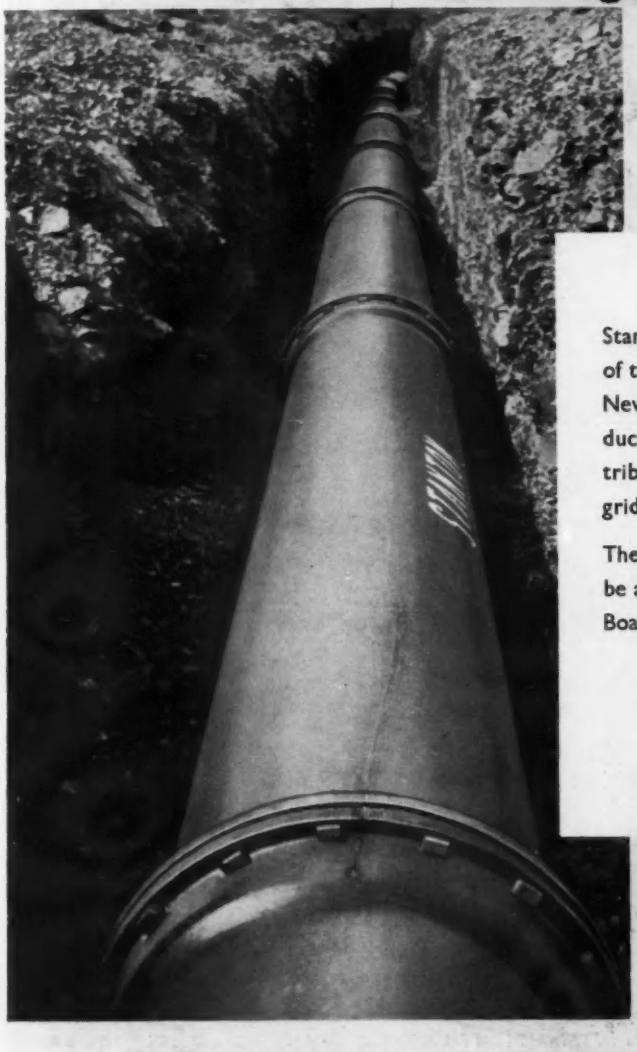
PL 2

STANTON

SPUN IRON PIPES AND FLEXIBLE JOINTS

for Gas at High or Low Pressures



Stanton supplied cast iron mains for the greater part of the 550 miles grid distribution system of which the New Litchurch Gas Works is one of the main gas producing units. The Company's Coke Oven Plant contributes 1,000,000 cubic feet of gas per hour to the grid system.

The Stanton Ironworks Company Limited is proud to be associated with another important East Midland Gas Board Scheme.

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  - REFINED
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  - GENERAL CASTINGS
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- COKE OVEN BY-PRODUCTS
- BRICKS
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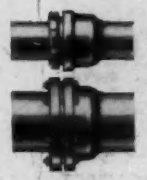

All Stanton Spun Iron Pipes are individually works tested to an internal hydraulic pressure of 500 lb. per sq. inch.

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